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Metals Review

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ASM REVIEW OF METAL LITERATURE

Because of Overflow Attendance, the First Meeting of the Georgia Chapter's Educational Series on "Making and Shaping of Steel" Was Held Outdoors in the Atlantic Steel Co.'s Picnic Grove. At the speaker's stand, J. K. Stafford, foreman, melt shop, discusses "Electric Furnace Operations"

Education Goes All-Out in Georgia

Reported by Michael F. Wiedle, Jr.
Advertising Department
Atlantic Steel Co.

The Georgia Chapter of the American Society for Metals has recently completed a series of four educational lectures on the "Making and Shaping of Steel", an event which has been the "most successful venture" in the Chapter's history. The series consisted of shop-level talks by top-level supervisors from Atlantic Steel Co., and a panel discussion by four outstanding speakers on "Toolsteel". Pamphlets on steelmaking were distributed at each meeting and were used as texts for the course. Average attendance at the meetings was 180, 50% of which was made up of personnel from the Lockheed Aircraft Corp., a nonferrous industry located some 20 miles north of Atlanta.

The first lecture on "Openhearth and Electric Furnace Operations" was given by J. E. Wilbanks, superintendent, melting department, and J. K. Stafford, general foreman, electric melt shop.

Mr. Wilbanks presented a comprehensive picture of the steelmaking facilities of the Atlantic Steel Co., and proceeded to make an imaginary heat of steel, from raw materials to the finished heat.

The second lecture, "Processing Steel From Ingots to Shapes", was given by R. M. Lang, superintendent, rolling mills, and David Lennox, Jr., assistant superintendent, roll shop. The third lecture on "Making and Fabrication of Steel Into Consumer Products" was given by G. C. Hightower, superintendent, special products department, and W. G. Patterson, assistant superintendent, wire departments. A tour of the company's various facilities followed each lecture, after which question and answer periods were held.

The fourth in the series of lectures was a panel discussion on "How You Can Select Your Toolsteels", moderated by Robert J. Raudebaugh, professor and acting director, school of chemical engineering, Georgia Institute of Technology. Speakers on the panel included: A. R. Boyd, branch manager, Carpenter Steel Co.; Harold Dicks, southern manager, A. Milne and Co.; M. J. McKeever, district manager, Crucible Steel Co. of America; and A. J. Mueller, president, A. J. Mueller Co.

Philip Duffy, chairman of the educational committee, Dick Priess, chapter chairman, and R. H. Wright, general superintendent, Atlantic Steel Co., cooperated in making this educational series Georgia Chapter's biggest success.

The Atlantic Steel Co. supplied lecturers, meeting place, cafeterial facilities, plant tours and guides.

New Films

Hold Everything

Hold Everything is the descriptive title of the new 16-mm. sound movie recently released by the Allen Manufacturing Co. This is the first Kodachrome sound movie to be filmed about Allen socket screws by the originators of this type screw.

The running time of the film is 20 min. It was produced by Bay State Film Productions, Springfield, Mass., for the Allen Manufacturing Co. The film is based on three major themes. The first describes the reasons why leading industrial distributors carry the Allen line, the second points up the important differences between socket screws and other types of fasteners, and the third illustrates the advantages that socket screws maintain over other fasteners.

Persons interested in the film should write to: Allen Manufacturing Co., Sales Dept., Hartford 2, Conn.

York Chapter Hears Hardness Testing Talk

Reported by D. G. Livingston
Hill-Chase & Co.

The York Chapter recently heard V. E. Lysaght of the Wilson Mechanical Instrument Division of American Chain and Cable Co., speak on "Hardness Testing".

The commonly used testing machines for determining resistance to permanent indentation are the Brinell, Rockwell and Diamond Pyramid hardness testers. These are known as indentation hardness testers and the speaker outlined their historical development, construction and operation. He also mentioned the special characteristics of the Scleroscope, Monotron and motor-driven Brinell and Rockwell testers.

Portable hardness testers are now available in a variety of designs. They are not as accurate as the conventional bench-type tester, but are valuable for parts of odd size and shape or in inconvenient locations. The Ames, Webster, King and Riehle testers are of the gooseneck type, while the Barcol Impressor, Poldi and Ernst are used to measure hardness in the center of large sheets and large pieces.

The file test may be considered as another variety of portable tester.

Mr. Lysaght outlined seven precautions which should be taken in performing indentation hardness tests, which have to do with such matters as time under load, rate of load application, normality of test surface to load, spacing of indentations, and surface conditions. Conversion of one type of hardness value to another should be used with discretion, the speaker pointed out. The National Bureau of Standards has done considerable work on this problem but so far no conversion is mathematically exact.

Special fixtures for testing irregular shapes such as gears, cams, and cylindrical parts were described and illustrated.

Microhardness testers are used to measure accurately an indentation over a restricted area. Numerous types of such equipment are available in addition to the well-known Tukon tester and the Knoop indenter, some of which are an attachment to the metallurgical microscope.

The method of preparing the surface of the material for microtesting may considerably affect the hardness value. Other factors affecting the results are the speed of loading and orientation of specimens with respect to crystallographic planes.

Mr. Lysaght's excellent set of slides included illustrations of the microhardness test of carbides and high speed steel, a small fluted tap that failed because of hard and soft films in the threads, and tiny watch parts, drill rods, surgical needles and pen points. Great care must be taken in preparing such samples for test. Electroplated surfaces offer another field for this type of equipment.

Company Changes Name

The Kold-Hold Manufacturing Co., Lansing, Mich., manufacturers of refrigeration equipment and products in the industrial and domestic heating fields, has announced a change in its corporate name to Tranter Manufacturing, Inc. The change was voted as the result of a well-established product diversification program. It will have no effect on ownership of company or its corporate structure.

Indian Metallurgist Emigrating to Canada

Gustad P. Contractor, who has recently relinquished his services with the Indian Council of Scientific and Industrial Research, plans to emigrate to Canada shortly, where he and his family will take up permanent residence.

Dr. Contractor was educated in India, England, Scotland and Germany, and holds the Henry Cort Medal of the University of Manchester. He has done extensive work on various ordnance steels, ferro-alloys, and also specialty steels of different types. He was mainly responsible for the planning, establishing and organizing of the National Metallurgical Laboratory in India, and has held government inspecting posts over the past several years. Dr. Contractor, who has had many technical papers published both in India and abroad, was a Government of India delegate to the World Metallurgical Congress.

Ipsen Opens Western Branch

Due to greatly expanded sales on the West Coast, Ipsen Industries Inc., Rockford, Ill., manufacturers of automatic heat treating equipment, has announced the opening of a new sales and service division in Burbank, Calif. The branch office and warehouse were constructed to meet the rapidly growing demand for Ipsen equipment in the Far West and to provide maximum maintenance facilities and service to customers and prospective customers.

New York Members Receive Silver Certificates

Six Members of the New York Chapter Who Were Given Silver Certificates in Recognition of 25 Years of Active Membership Are, From Left: M. Gensamer, Columbia University; O. Henry, Brooklyn Polytechnic Institute; O. H. Shettler, Wilson Mechanical Instruments Corp.; G. A. Lux, Oakite Products, Inc.; R. M. Sample, Sample Marshall Laboratories; H. E. Sanson, Jr., for H. E. Sanson; and J. J. Preisler, Sperry Gyroscope Corp.

Detroit Chapter Hears Practical Heat Treating Talk

Reported by Donald N. Frey
Scientific Laboratory
Ford Motor Co.

The Detroit Chapter recently heard a lecture on "Practical Heat Treatment" by Norman Kates, Lindberg Steel Treating Co. Mr. Kates confined his lecture to heat treatment of tools and dies on a custom hardening basis. He divided his subject into the problems of design, steel selection, machining, and heat treating and straightening, all as they apply to tools and dies.

Under design, Mr. Kates outlined, as he put it, "commonly quoted but too often neglected" factors. These included the "don'ts" of blind holes, unequal sections, sharp corners, and too-close tolerances.

Steel selection should be made in such a way as to keep the number of grades low. Proper nomenclature for steels should be used to avoid needless failures in the heat treating operation. Mr. Kates mentioned that in his own plant all tools and dies are spark tested before heat treating to check whether the material is according to specification. Also, within captive shops, steels should be selected on the basis of the heat treating equipment available. Material cost in tool and die manufacture is usually a negligible factor, and to cut corners on material is frequently penny wise and pound foolish.

Conditions holding during machining frequently influence response to heat treating. First, if mill decarburization is not removed during machining, soft surfaces and cracking may show up after heat treating. Rough machining to too-high residual stresses results in parts out of dimensional tolerance after heat treating. Also, stamped identification marks and deep layout marks frequently act as crack starters. Poor practice grinding of course leads to the well known, and all too frequent, surface cracking.

In speaking of heat treating in general, Mr. Kates stated that good maintenance is a must. Temperature control is too often poor, neutral salt baths should be rectified more often, neutral atmospheres drift off and start to decarburize or carburize, etc. He pointed out the benefits to be derived from using high-fluid velocities in oil quenching baths (flush quenching), and also from the use of marquenching on difficult to harden parts. Preheating varies from job to job but appears to be beneficial in many tricky jobs.

Mr. Kates showed slides illustrating bad examples or failures, as well as examples of difficult heat treating jobs which were successfully executed.

Tulsa Host at Petroleum Exposition

The Tulsa Chapter Was Host at the Tulsa Council of Technical Societies Registration Booth for Engineers at the International Petroleum Exposition Held in May. From left, standing, are: Jack T. Teed, Brown Instrument Division, Minneapolis-Honeywell Regulator Co.; J. C. Holmberg, retiring chairman of the Tulsa Chapter, Douglas Aircraft Co., Inc. Seated are Robert J. Cottingim, new secretary - treasurer, Douglas Aircraft Co., Inc.; and George E. Sykora, new vice-chairman, Wells - Surveys, Inc.

Principles of Welding Discussed at Ft. Wayne

Reported by A. D. Carvin
Joslyn Stainless Steels

Robert H. Aborn, assistant director, research laboratory, U. S. Steel Co., spoke on the "Metallurgical Principles Involved in Welding" before a recent meeting in Fort Wayne.

Yesterday welding was a blacksmith's art; today it is a science. There are 32 welding processes which fall into two main groups, those depending on mechanical pressure and those not depending on mechanical pressure. The pillars for good welding are design, material and workmanship.

Many improvements can be expected shortly in electrodes, low-temperature welding, argon or helium-shielded arc welding, flash welding with protective shield, as well as in atomic fission welding.

Hydrogen is a saboteur in welding, but low-hydrogen electrodes are presently being developed. Such electrodes are particularly necessary in welding high-hardenability steels.

Low-temperature welding requires tremendous pressures and clean surfaces, the speaker concluded.

Armco Opens Strip Mill

A new $40-million hot strip mill was officially placed in service recently at Armco Steel Corp.'s Ashland, Ky., plant, where the newest and the oldest continuous steel rolling mills in the world are both located.

Under construction for over two years, the new 80-in. mill is the most modern of its kind in the world. It will roll 10-ton steel ingots into thin strips of steel hundreds of feet long in a continuous process. The mill is housed in a building almost ½ mile long, and has a capacity of 150,000 tons of finished sheet steel a month, enough for 133,000 new automobiles.

Just 30 years ago, Armco developed the continuous rolling process at its Ashland plant, and some of the basic facilities of the original mill are still in operation.

1953 Preprint List

Papers for Presentation at the National Metal Congress, Cleveland, October 1953, and Midwinter Meeting, Boston, March 1954

All of the following papers will be preprinted for distribution to members of the American Society for Metals upon request. The Society will print only 10% in excess of the number of orders for preprints in the office on press date, and this excess 10% will be sent out as long as it lasts. Order the papers by their numbers before August 15, 1953.

TITANIUM AND MOLYBDENUM

1. **Determination of Oxygen in Titanium and Zirconium by the Isotopic Method,** by A. D. Kirshenbaum, R. A. Mossman and A. V. Grosse, Research Institute of Temple University.

2. **Vacuum-Fusion Analysis of Molybdenum,** by M. W. Mallett, Assistant Supervisor, Thermal Chemistry Group, and C. B. Griffith, Battelle Memorial Institute.

3. **Nitriding of Titanium With Ammonia,** by J. L. Wyatt Assistant to Technical Manager, Horizons, Inc., and N. J. Grant, Associate Professor of Metallurgy, Massachusetts Institute of Technology.

4. **Heat Treatment of High-Strength, Titanium-Base Alloys,** by W. M. Parris, Engineer, P. D. Frost, Assistant Supervisor, and J. H. Jackson, Supervisor, Battelle Memorial Institute.

TITANIUM

5. **Transformation Kinetics and Mechanical Properties of Titanium-Aluminum-Molybdenum Alloys,** by H. D. Kessler, Supervisor, Nonferrous Metals Research, and M. Hansen, Chairman, Metals Research, Armour Research Foundation.

6. **Transformation Kinetics and Mechanical Properties of Titanium-Aluminum-Chromium Alloys,** by H. D. Kessler, Supervisor, Nonferrous Metals Research, and M. Hansen, Chairman, Metals Research, Armour Research Foundation.

7. **Isothermal Transformation of Titanium-Manganese Alloys,** by P. D. Frost, Assistant Supervisor, W. M. Parris and L. L. Hirsch, Research Engineers, Nonferrous Metallurgy, J. R. Doig, Research Engineer and C. M. Schwartz, Supervisor, Physics Division, Battelle Memorial Institute.

8. **Correlation Between Heat Treatment, Microstructure and Mechanical Properties of Titanium-Molybdenum Alloys,** by D. J. DeLazaro, Assistant Metallurgist, and W. Rostoker, Senior Metallurgist, Metals Research Department, Armour Research Foundation.

MECHANICAL

9. **Transverse Mechanical Properties of Slack-Quenched and Tempered Wrought Steel,** by John Vajda and Paul E. Busby, Carnegie Institute of Technology.

10. **A Time-Temperature Relationship for Recrystallization and Grain Growth,** by F. R. Larson and J. Salmas, Physical Metallurgists, Watertown Arsenal Laboratory.

11. **Effect of Non-Martensite Decomposition Products on the Properties of Quenched and Tempered Steels,** by E. F. Bailey, Metallurgist, Naval Research Laboratory.

12. **The Effect of Inclusions on the Fatigue Strength of SAE-4340 Steels,** by J. T. Ransom, Research Project Engineer, E. I. duPont deNemours & Co.

NONFERROUS

13. **The System Zirconium-Aluminum,** by D. J. McPherson, Supervisor, and M. Hansen, Chairman, Metals Research Department, Armour Research Foundation.

14. **Observations on the Behavior of Hydrogen in Zirconium,** by C. M. Schwartz and M. W. Mallett, Battelle Memorial Institute.

15. **Recrystallization Applied to Control of the Mechanical Properties of Molybdenum,** by J. H. Bechtold, Westinghouse Electric Corp.

PHYSICAL METALLURGY

16. **Supercooling and Dendritic Freezing in Alloys,** by W. C. Winegard and B. Chalmers, University of Toronto.

17. **Fretting Corrosion on Mild Steel in Air and in Nitrogen,** by I. Ming Feng and H. H. Uhlig, Massachusetts Institute of Technology.

18. **The Effect of Pearlite Spacing on Transition Temperature of Steel at Four Carbon Levels,** by J. A. Rinebolt, Metallurgist, Naval Research Laboratory.

19. **Elevation of Critical Temperatures in Steel by High Heating Rates,** by W. J. Feuerstein, Metallurgist, and W. K. Smith, Head, Metallurgy Section of Materials Evaluation Branch, Naval Ordnance Test Station.

BORON

20. **A Hypothesis for the Boron Hardenability Mechanism,** by J. W. Spretnak and Rudolph Speiser, Associate Professors, Department of Metallurgy, Ohio State University.

21. **The Effect of Boron on Notch Toughness and Temper Embrittlement,** by A. E. Powers and R. G. Carlson, Turbine Division, General Electric Co.

22. **A Study of the Fe-Fe$_2$B System,** by C. C. McBridge, E. I. duPont Co., Savannah River Plant, and J. W. Spretnak and Rudolph Speiser, Associate Professors, Department of Metallurgy, Ohio State University.

23. **The Carbonitriding of Boron Steels,** by G. W. Powell, M. B. Bever and C. F. Floe, Massachusetts Institute of Technology.

TEMPERING

24. **The Effect of Silicon on the Kinetics of Tempering,** by W. S. Owen, University of Liverpool, England.

25. **Microstructural Changes on Tempering Iron-Carbon Alloys,** by B. S. Lement, B. L. Averbach and M. Cohen, Department of Metallurgy, Massachusetts Institute of Technology.

26. **Effect of Chemical Composition on Susceptibility of Steels to Temper Brittleness,** by Ralph Hultgren, Professor of Metallurgy, and John Chuan Chang, University of California.

27. **The Embrittlement of Alloy Steel at High-Strength Levels,** by L. J. Klingler, W. J. Barnett, R. P. Frohmberg and A. R. Troiano, Department of Metallurgical Engineering, Case Institute of Technology.

CONSTITUTION

28. **Equilibrium Structures in Fe-Cr-Mo Alloys,** by J. G. McMullin, S. F. Reiter and D. G. Ebeling, Research Laboratory, General Electric Co.

29. **A Survey of Vanadium Binary Systems,** by W. Rostoker, Senior Metallurgist, and A. Yamamoto, Associate Metallurgist, Armour Research Foundation.

30. **Gamma Loop Studies in the Iron-Vanadium and the Iron-Vanadium-Titanium Systems,** by W. R. Lucas, Graduate Student, and W. P. Fishel, Professor of Metallurgy, Vanderbilt University.

STAINLESS AND HIGH SPEED STEEL

31. **High-Temperature Transformations in Ferritic Stainless Steels Containing 17 to 25% Chromium,** by A. E. Nehrenberg, Supervisor, Research Laboratory, and Peter Lillys, Research Metallurgist, Crucible Steel Co. of America.

32. **Intergranular Corrosion of Ferritic Stainless Steels,** by R. A. Lula, A. J. Lena and G. C. Kiefer, Allegheny Ludlum Steel Corp.

33. **Grain Growth in High Speed Steel,** by Eric Kula and Morris Cohen, Department of Metallurgy, Massachusetts Institute of Technology.

34. **Discontinuous Grain Growth in High Speed Steel,** by A. H. Grobe, Research Metallurgist, C. A. Roberts, Chief Metallurgist, and D. S. Chambers, Vanadium-Alloys Steel Co.

MECHANICAL

35. **Strain Aging Behavior of Rheotropically Embrittled Steel,** by E. J. Ripling, Assistant Professor, Department of Metallurgy, Case Institute of Technology.

36. **Flow and Fracture of Single Crystals of High-Purity Ferrites,** by R. P. Steijn, Assistant Professor, Rice Institute, and R. M. Brick, Professor of Metallurgy, University of Pennsylvania.

37. **Notched Bar Tensile Properties of Various Materials and Their Relation to the Unnotch Flow Curve and Notch Sharpness,** by Harry Schwartzbart, Research Metallurgist, Armour Research Foundation, and W. F. Brown, Jr., Research Metallurgist, National Advisory Committee for Aeronautics.

38. **Effect of Some Solid Solution Alloying Elements on the Creep Parameters of Nickel,** by Thomas Hazlett, Research Engineer, and Earl R. Parker, Professor of Metallurgy, University of California.

MISCELLANEOUS

1W. **Solution and Precipitation of Aluminum Nitride in Relation to the Structure of Low-Carbon Steels,** by W. C. Leslie, R. L. Rickett, C. L. Dotson and C. S. Walton, Research Laboratory, U. S. Steel Corp.

2W. **Roles of Aluminum and Nitrogen in Graphitization,** by E. J. Dulis and G. V. Smith, Research Laboratory, United States Steel Corp.

3W. **Effect of Grain Size and Carbon Content on the Low-Temperature Tensile Properties of High-Purity Fe:C Alloy,** by R. L. Smith, Franklin Institute, Philadelphia, and C. Spangler and R. M. Brick, Department of Metallurgical Engineering, University of Pennsylvania.

4W. **Effective Diameter of Solute Atoms in Interstitial Solid Solutions,** by Rudolph Speiser and J. W. Spretnak, Associate Professors of Metallurgy, and W. J. Taylor, Assistant Professor of Chemistry, Ohio State University.

HARDENABILITY

5W. **Another Look at Quenchants, Cooling Rates and Hardenability,** by D. J. Carney, Chief Development Metallurgist, South Works, U. S. Steel Corp.

6W. **Thermal Reproducibility of the End-Quench Test,** by John Birtalan, R. G. Henley, Jr., and A. L. Christenson, Timken Roller Bearing Co.

7W. **Analysis of Hardenability Under Marquenching Conditions,** by C. M. Carman D. F. Armiento and Harold Markus, Metallurgists, Frankford Arsenal.

8W. **The Influence of Heat Treating Variables on the Martensite Transformation in SAE 1050 Steel,** by M. R. Meyerson and S. J. Rosenberg, National Bureau of Standards.

STAINLESS

9W. **The Formation of Sigma Phase in Types 309 and 310 Stainless Steel,** by R. C. Frerichs and C. L. Clark, Metallurgical Department, Timken Roller Bearing Co.

10W. **Precipitation Hardening in Austenitic Chromium-Nickel Steels Containing High Carbon and Phosphorus,** by A. G. Allten, J. G. Y. Chow and A. Simon, Research Laboratory, Crucible Steel Company of America.

11W. **The Substitution of Manganese for Nickel in 16-25-6 Alloy,** by Wells E. Ellis, Research Metallurgist, and Martin Fleischmann, Metallurgical Engineer, Timken Roller Bearing Co.

12W. **Work Softening of 16-25-6 Alloy at Elevated Temperatures,** by Douglas A. J. Millar, Instructor, and John Wulff, Professor, Department of Metallurgy, Massachusetts Institute of Technology.

MECHANICAL AND NONFERROUS

13W. **Effect of Grain Size on High-Temperature Fatigue Properties,** by J. E. Breen and J. R. Lane, Naval Research Laboratory.

14W. **Mechanical Anisotropy in Copper,** by W. A. Backofen, Assistant Professor, A. J. Shaler, Associate Professor, Department of Metallurgy, Massachusetts Institute of Technology, and B. B. Hundy, Scientific Officer, British Iron and Steel Research Association, Sheffield, England.

15W. **Effect of Prestrain Histories on the Creep and Tensile Properties of Aluminum,** by Oleg D. Sherby and Alfred Goldberg, Research Engineers, and John E. Dorn, Professor of Physical Metallurgy, University of California.

16W. **Effect of Dispersions of $CuAl_2$ on the Elevated Temperature Tensile Properties of Al-Cu Alloys,** by C. D. Starr and R. B. Shaw, Research Engineers, and John E. Dorn, Professor of Physical Metallurgy, University of California.

From the Metal Showman

AMERICAN Society for Metals over the years of its existence has instigated and completed many a project aimed at broadening the interest of the American public in the metals industries of the nation.

Among these significant achievements have been the World Metallurgical Congress and the slow but steady rise in stature and national importance of the National Metal Expositions.

None, however, have been more basic nor more penetrating in the minds of the general public than one activity which is little known to most American businessmen and industrialists—the National Science Teachers Awards. This is a nationwide essay project, participated in by high school science and technical students, and conducted by the National Science Teachers Association from its Washington, D. C., headquarters. The competition is promoted largely with A.S.M. funds, and an important portion of the annual monetary awards is made possible by a yearly grant from A.S.M.

In generating interest among science and technical high school students in the fields of engineering, the Society is carrying on a worthy project which cannot help but benefit all American industry.

To date this year more than 13,000 entry blanks have been issued to students seeking to participate. To enter the competition, which is handled on a regional, state and national basis, a student must qualify by convincing his science teacher that he is genuinely determined to carry out within one year's school term a completed project, and to write his findings in acceptable fashion for submission at a specified date.

During the 1952 award year, the kids of the nation surprised the judges by coming up with engineering and scientific projects little short of astounding for youngsters. Much of the thinking and creative engineering that went into the projects was worthy of the best practicing talents in industry. Of the thousands of teen-agers participating, perhaps 100 entries revealed an imaginative, highly creative approach to engineering and scientific problems, many hundreds more displayed the clear, uncluttered thinking and reasoning power which must make the drudgery of teaching seem, to many a NSTA member, worth all the trouble. For it is from minds like these that America will draw her strength and her leadership in the more exacting fields in the years to come.

Details of these annual competitions are not too important to busy industrialists. That they are carefully and conscientiously handled by the science teachers themselves is sufficient evidence of high standards. Far more important is the fact that American Society for Metals has made possible, with the help of NSTA, real recognition for youngsters dreaming of careers in science and engineering. From THE METAL SHOWMAN Vol. I—No. 3.

Cites Continuous Casting Benefits

Reported by Eugene M. Smith

Development Engineer
Babcock & Wilcox Co.

Isaac Harter, Jr., engineer in charge of continuous casting at Babcock & Wilcox Co., spoke on "Recent Developments in Continuous Casting of Steel", at Mahoning Valley recently.

Participating with Mr. Harter in the presentation of the talk was Charles Boren, photographer, and William Wilson, technical engineer, for Babcock & Wilcox.

Using an illustrative and schematic motion picture and prepared slides, the visitors presented an excellent story of the development of continuous casting.

Mr. Harter illustrated how continuous casting of steel presents an opportunity to eliminate the use of ingot molds, ingot stripping, soaking pit, and heavy breakdown mills. Thus, capital and operating costs should be decreased and decentralization of facilities made possible.

Although Sir Henry Bessemer obtained a continuous casting patent about 100 years ago, progress was slow until the nonferrous industry began to use it on a commercial scale. The first shipment of continuous cast steel was made in 1947; it is expected that in 1953 commercial production of continuous cast steel will be achieved.

The process consists in pouring molten steel continuously from a container into a water-cooled brass mold, lowering the solidifying steel through the collar-like mold at a constant rate, and cutting the resulting shape into the desired length. Because the process is vertical (a casting tower approximately 75-ft. high is used to house the equipment), the height to the casting floor should be about 50 ft.

Presently, steel is melted in a 3-phase electric arc furnace. Raw material is scrap and electric furnace steel practice is used to prepare metal for casting.

To separate any carried-over slag, a tilting tundish is provided ahead of the mold. Ovals, squares as large as 7 by 7 ft. and slabs 3 by 15 ft. have been cast successfully. Segregation is practically absent in continuous castings. Speed of casting approaches 60 in. per min., or 24 tons per hr., for a 7 by 7 ft. square.

The high yields (about 90%) and low capital costs obtained with continuous casting have stimulated considerable interest in the steel industry. Since continuous cast ingots have good crystal structure and excellent surface conditions, conditioning cost will be negligible.

Metal Finishing Topic at Officers Night

J. C. Holmberg (left), Retiring Chairman of the Tulsa Chapter, Presents T. N. Duncan, Newly Elected Chairman for the 1953-54 Season, With Gavel and Chapter Bell. Hubert Goldman (right), Enthone, Inc., who addressed the meeting on "Metal Finishing", looks on. (Photograph by W. Lorkovic)

Wilson Presents Charter to Carolinas Chapter

National President Ralph L. Wilson Presents the Chapter Charter to Chairman A. R. Fairchild and the Carolinas Chapter Executive Committee. Standing, from left, are: J. E. Austin, P. A. Williams, M. Milo, Mr. Fairchild, P. A. Moody, Mr. Wilson, M. V. Davis, W. H. Brinkley, and E. R. Talone. Seated, from left, are: H. R. Tillman, J. J. Hairston, W. L. Cason, A. B. Cooper, H. F. Blackwood, and J. R. Huntley

Reported by James J. Hairston
Engineer of Manufacture
Western Electric Co., Inc.

Seventy-five members and guests witnessed the presentation of the Charter to the Carolinas Chapter at a dinner meeting in Winston-Salem. National President Ralph L. Wilson presented the Charter to Albert R. Fairchild, chairman, who accepted on behalf of the Chapter. The Carolinas Chapter thus became the eighty-fourth chartered chapter of the American Society for Metals.

The Carolinas was organized at an informal meeting held in Charlotte in November 1952, attended by 21 members and prospective members eager to see an A.S.M. chapter established in the area. Metallurgically speaking, this section was supposed to be rather barren ground on which to plant such a chapter. However, after many anxious moments on the part of the early organizers, 25 signatures were appended to a petition requesting the Society to grant a Charter. Starting in January of this year, four highly successful regular meetings have been held with attendance and interest mounting with each succeeding meeting. Interest in the Carolinas Chapter and the society has gone far beyond the expectations of the early organizers, an interest evidenced by the Chapter's 90 members, including nine sustaining members, from all parts of the area the Chapter covers (North and South Carolina and the Southern part of Virginia).

The Charter Night dinner and meeting was the climax of a very successful year. After dinner, C. J. Rix, assistant purchasing agent, North Carolina Works, Western Electric Co., Inc., the coffee speaker, gave a brief talk on "Technical Training at the High School Level" in which he told of the difficulties in interesting students and their parents in the advantages of vocational training. The existing facilities in this area for vocational training were reported to be only partially used due to lack of interest by the students in this type of training in high school. Mr. Rix urged that the Carolinas Chapter join with other organizations in endeavoring to inform and interest students and their parents in vocational training in high school.

Following the presentation of the Charter, each member of the Carolinas Executive Committee was recognized by the chairman and presented individually to President Wilson. Following the ceremonies, Mr. Wilson spoke briefly about the A.S.M. and its work and then gave a highly interesting talk on "Engineering Alloys", illustrated with many well-chosen slides showing the results of various investigations in this country and abroad.

The Officers of the Carolinas Chapter include: A. R. Fairchild, Western Electric Co., Inc., chairman; J. R. Huntley, Tool Service Engineering Co., vice chairman; H. F. Blackwood, Western Electric Co., Inc., secretary; and A. B. Cooper, Edgcomb Steel Co., treasurer.

New Uranium Rolling Mill

The first and only mill in the country designed expressly for the production rolling of uranium was recently put into operation at Fernald, Ohio, for the Atomic Energy Commission.

Operations at the new uranium rolling mill are playing a vital role in the defense production of atomic weapons. The mill, which is part of the Commission's new uranium production center at Fernald, produces uranium for use in A.E.C. fissionable materials plants throughout the country. It is operated for the A.E.C. by the National Lead Co. of Ohio.

Some Effects of Neutron Irradiation of Cu Crystals

Reported by J. H. Schaum
National Bureau of Standards

P. H. Blewitt of the Solid State Division, Oak Ridge National Laboratory, presented an interesting discussion of "The Effect of Neutron Irradiation on the Properties of Copper Single Crystals" at a meeting of the Washington Chapter.

Dr. Blewitt explained how neutron bombardment of metal crystals displaces the atoms and thereby increases the hardness of annealed materials. The effect is not analogous to cold work, the speaker stated, but is similar to solid solution hardening. Slip lines in radiated copper are similar to those in alpha brass.

Solid materials in service could conceivably be hardened by radiation when it would otherwise be impossible to add alloys or subject to mechanical cooling. It has also been found that relaxation time at low temperature can be hastened by irradiation.

G. E. Transfers Welding Department to York, Pa.

The General Electric Co. has announced that its welding department, located in Fitchburg, Mass., since 1946, will be transfered to York, Pa., by the end of March 1954.

The planned transfer will enable the welding department, and the company's small turbine and supercharger department, which will remain in Fitchburg, to expand and thereby provide room for predicted increases in the business of both departments.

The welding department is scheduled to move into a newly vacated company plant at York, which will allow room for necessary manufacturing expansion.

Past Chairmen Honored by Canton-Massillon

The Canton-Massillon Chapter Was Host to National President Ralph L. Wilson and 18 Past Chairmen of the Chapter at a Recent Meeting. Mr. Wilson presented a history of "Alloy Steels in the Canton-Massillon District". Shown are, front row, from left: H. C. McKimmey (1943-44); R. Sergeson (1932-33); R. L. Wilson (1931-32); E. C. Smith (1928-29); G. Meldrum (1952-53). Center row, from left: J. Welchner (1950-51); L. A. Zeitz, newly appointed secretary; C. H. McCollam (1937-38); D. A. Barnes (1951-52); L. L. Ferrall (1936-37); T. J. Black (1935-36); and E. S. Rowland (1944-45). Last row, from left: W. J. Buechling (1938-39); G. Soler (1940-41); S. Poole (1946-47); G. Riegel (1945-46); H. Morrow (1948-49); W. G. Bischoff (1939-40); Oscar J. Horger (1947-48); Ernest Lancashire; and David C. Ladd (1944-45)

Reported by J. M. Brunner
Laboratory Metallurgist
Republic Steel Corp.

At the May meeting of the Canton-Massillon Chapter, Ralph L. Wilson, national president of A.S.M. and director of metallurgy of the Timken Roller Bearing Co., spoke on the "Story of Alloy Steels in the Canton-Massillon District".

The opening remarks covered the tentative arrangements being made for a second World Metallurgical Congress to be held in Europe.

Mr. Wilson, who started in the steel business in the Canton-Massillon area in 1922, was able to draw from his own experience freely in relating the story of alloy steel. In addition, considerable research work had been done to establish the early history. The first steel plant in Canton was operated in 1874 and was commonly known as the Canton Steel Co. In 1902, the United Steel Co. was incorporated and produced steel in 1903. From an original capitalization of $300, the business was developed to a $16,000,000 concern. The U. S. Steel Co. was organized to supply sheet bars to the Stark Rolling Mill Co. which was supplying sheet stock to the Berger Manufacturing Co. for fabricated eaves troughs, downspouting, culverts, and art-metal ceilings. In 1916, the Stark Rolling Mill Co. was considered to be the largest sheet mill in the world.

Henry Ford was closely associated with the development of alloy steels in the Canton-Massillon area. The story is well known about how a wrecked foreign racing car was found to contain vanadium in many of the important steel operating parts. Mr. Ford used this information to convince the United Steel Co. to produce steel containing this element. Many heats were made before success was attained. The Transue-Williams Co., which is still a big forging producer in this area, was noted as being the forging source of this early Ford activity. The period of 1906-1907 is recognized as the beginning of this commercial production of alloy steel which has grown until this area is recognized as the world's largest producer of electric furnace alloy steel.

In 1913, electric furnace steel was first produced at U. S. Steel in Canton and Central Steel Co. in Massillon. The Timken Roller Bearing Co. produced electric furnace steel in 1916.

Springfield Hears Talk On Stainless Steel

Reported by Howard E. Boyer
Chief Metallurgist
American Bosch Corp.

"Stainless Steels" were discussed by F. Kenneth Bloom, research metallurgist for the Armco Steel Corp., at a recent meeting in Springfield.

Mr. Bloom reviewed briefly the history and development of the standard grade of stainless steel and pointed out how the new grades of stainless steel fit into today's picture. The properties and uses of the extra low carbon steels, having a maximum carbon content of 0.03%, were reviewed. Practical applications which have been made of these new alloys in various grades of welded vessels were illustrated by several slides. The availabilities of these steels has made possible the conservation of significant amounts of the critical alloying element, columbium.

The composition and properties of the precipitation hardening stainless steels were presented. These alloys, which offer a combination of good formability, corrosion resistance, and an ability to harden at low temperatures to give unusually high strength-weight ratio, have found rapidly expanding uses in military aircraft applications. Several slides were presented to illustrate a variety of interesting new uses for these steels.

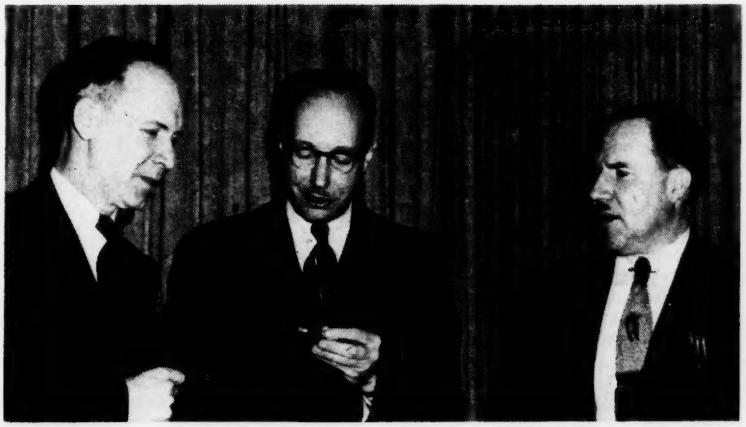
The modified 17% chromium alloys containing titanium and the high-manganese, low-nickel steels were mentioned as examples of newer alloys which have been developed as substitutes in part for the 18% chromium-8% nickel steels.

Tatnall at Notre Dame

Reported by R. C. Pocock
Bendix Products Div.

The Notre Dame Chapter heard an address on "Is Testing Necessary" by Frank G. Tatnall, manager of testing research of the Baldwin-Lima-Hamilton Corp., at a recent meeting. The speaker gave a rapid-fire and hilarious presentation of the entire field, interspersed with incidents from his 30 years experience.

Boston Hears Uhlig on Corrosion



Herbert Uhlig (Center), in Charge of the Corrosion Laboratory of the Metallurgy Department at Massachusetts Institute of Technology, Spoke on "Corrosion", at a Meeting of the Boston Chapter. Dr. Uhlig is shown with Richard Pomfret (left), technical chairman, and William Badger, chairman

Reported by William F. Collins
Carr Fastener Co.

Herbert Uhlig, in charge of the corrosion laboratory, department of metallurgy, Massachusetts Institute of Technology, addressed the Boston Chapter on "Corrosion" recently.

A knowledge of why metals corrode, and what to do about it, is important economically to everyone who uses metals, as well as to everyone the world over concerned with conservation of metal supplies and human resources. Appreciation of the subject varies from the attitude of the business accountant who recognizes the seriousness of corrosion only if plant equipment fails short of the time it is amortized, to the engineer who wishes he knew more about methods, some of which are well known and others not yet discovered, for controlling corrosion damage at the time it occurs. But even engineers often overlook corrosion as a possible cause of metal failure. The fracture of a ship's propeller, explosion of a boiler or pressure vessel, and failure of bridge cables or an airplane propeller may be forms of corrosion damage less readily recognized than the more common types: their proper diagnosis is made more pertinent by the consequences that result from sudden failure.

Dr. Uhlig summarized the major types of corrosion and presented slides depicting each type. He surveyed the seven major approaches to corrosion control. The mechanism and operation of cathodic protection was discussed in detail as an example of perhaps the most effective recent development for controlling all forms of corrosion, including stress corrosion cracking and corrosion fatigue. He then outlined the fundamental factors entering corrosion of iron and steel exposed to natural waters, soils and the atmosphere and, in particular, the effects of heat treatment, cold work and residuals normal to steel.

Available facts make it unlikely that a low alloy steel will be developed having phenomenally improved corrosion resistance over steels presently known, particularly for exposure to water and soil. The general use of stainless steels (> 12% Cr) and similar corrosion resistant alloys is due to increase, he said, because of increasing acceptance of a bright metallic surface for architectural and automotive trim, and because of the progressive reliance of food and chemical industries on these alloys.

Detroit Honors High School Science Teacher

Reported by Donald N. Frey
Metallurgical Laboratory
Ford Motor Co.

At the final technical meeting of the year for the Detroit Chapter, the Educational Committee presented a microscope to John D. Patterson for use in the metallurgy courses at Cass Technical High School of Detroit.

Mr. Patterson has devoted many years to the teaching of metallurgy and the presentation was made to honor him for his devotion to this work. It was pointed out in the presentation that the present shortage of engineers can be alleviated, to a large degree, by getting more high-school graduates interested in the various fields of engineering. Mr. Patterson is making a significant contribution to achieve this in the metallurgical field.

Ernest Hergenroether, International Nickel Co., spoke on the "Metal Supply Outlook—Current and Future".

Tells How Stress Affects Failures

From Left: Merrill A. Scheil, A. O. Smith Corp., Technical Chairman of the April Meeting of the Milwaukee Chapter, Is Shown With M. M. Frocht, Illinois Institute of Technology, Who Spoke on "Stress Concentrations and Their Significance in Failure", John M. Beyerstedt, Nordberg Manufacturing Co., past chairman, and E. Gammeter, Globe Steel Tubes Co., the newly elected chairman. (Photograph by J. L. Fidler, Globe Tubes Co.)

Reported by W. H. Myers
Macwhyte Co.

"Stress Concentrations and Their Significance in Failure" was the title of a talk presented to the Milwaukee Chapter by Max M. Frocht, research professor of mechanics and director of experimental stress analysis at Illinois Institute of Technology.

Prof. Frocht discussed the basic tenets of stress analysis and demonstrated methods of computing stress. In his talk he pointed out some of the unrealistic aspects of the engineering formula for stress and made comments on misconceptions about stress concentrations, methods for determining factors, precautions necessary in using available data, and significance under static and under fatigue conditions.

Oak Ridge Completes Educational Series on Powder Metallurgy

Reported by W. D. Manly
Oak Ridge National Laboratory

A series of educational lectures on "Powder Metallurgy" was recently concluded by the Oak Ridge Chapter. Speakers included J. M. Dalla Valle, Georgia Institute of Technology, Henry H. Hausner, Sylvania Electric Products Co., and R. K. Beggs, P. R. Mallory Co.

Dr. Dalla Valle summarized the diverse methods for measuring particle surface, with special attention to the "Fatty Acids Technique in Surface Measurement of Metal Powders". The merits of this method include relative ease of execution plus an accuracy of reproducibility approaching that of the proven method of evolving adsorbed gases under vacuum.

J. M. Dalla Valle

Surface measurement employing fatty acids is made possible due to the tendency of these acids, dissolved in an organic solvent such as benzene, to form closely packed, monomolecular layers on materials in contact with the solution. The amount of acid adsorbed on the surface of the powder sample can be determined by potentiometric titration, with NaOH, of portions of the fatty acid solution before and after exposure to the powder. Knowledge of the area occupied by an adsorbed molecule of the acid and the amount adsorbed makes possible a surface determination.

The second lecture, presented by Henry H. Hausner, on "Recent Advances in Powder Metallurgy" included material presented at the 1952 World Congress on Powder Metallurgy held in Austria.

From the European Conference came information on preparation, on a commercial scale, of dense metallic sheet formed from hopper-fed brass or iron powders. Fabrication is effected by continuously feeding the powder between the rolls of a mill and following by successive passes through a series of sintering furnaces and rolls. The existence of a high-temperature heating element (1700° C.), suitable for use in an oxidizing atmosphere, was disclosed, the constructional material being siliconized molybdenum.

H. H. Hausner

An interesting point concerning European powder metallurgy practice disclosed the manufacture of parts requiring very complex die equipment. The lower wages paid for this type of skilled labor makes it financially practical to build the intricate dies required.

Changes which occur during sintering were outlined and emphasis placed on the importance of the following: density, lattice parameter, electrical resistance, and contact area.

On the evening of the second powder metallurgy educational series, the Oak Ridge Chapter was honored by a visit from E. E. Thum, editor of *Metals Progress*. Mr. Thum presented a few remarks on the current news from the National Headquarters of the A.S.M.

The last speaker of the series, R. K. Beggs, gave a lecture on "Powder Metallurgy in Industry". He traced the origin of powder metallurgy to Wolleston's experiments in making massive platinum by pressing wet powders followed by firing at a red heat.

R. K. Beggs

Methods for preparing powders were outlined and many uses suggested. The application of powder metallurgy is, according to the speaker, dependent on the existence of at least one of two primary factors. These factors are: The minimizing of scrap and machining losses; and the need for techniques of fabrication unique to powder metallurgy. The manufacture of electrical contacts from copper and tungsten is an outstanding example of the latter.

The mechanics of and equipment for consolidation of powders to produce various products were discussed.

Speakers Present Talk On Lubrication of the Cold Forming of Steel

Reported by E. C. Kron
Doehler-Jarvis Corp.

A talk on "Lubrication in the Severe Cold Forming and Extrusion of Steel" prepared by Samuel Spring, Pennsylvania Salt Manufacturing Co., was presented by Ernest A. Erickson and Charles Swalm, of the same company, at a recent meeting of the Toledo Chapter.

In the severe cold forming of metal the lubricant must act as a physical separator to prevent the surfaces from coming within molecular distance of each other, and it must act to reduce rubbing friction so the surfaces may slide over each other with a minimum of effort.

A number of lubricants have been used to supply this separation. One involves the addition of fillers or pigments to the lubricant so they are trapped between the metal surfaces and prevent intimate contact.

Properly applied coatings of zinc phosphate are admirably suited to this application. The phosphatizing of metals for severe forming involves the formation of a substantial deposit of a crystalline-metal phosphate which is strongly attached to the surface. This is accomplished by contact of a hot solution of zinc phosphate in phosphoric acid for from 2 to 7 min., rinsing, and immersion in an oil soap or emulsion lubricant.

The porous nature of a phosphate coating is advantageous because it permits a quantity of organic lubricant to be absorbed in the porous matrix. This is released as the metal goes through the die, thereby providing lubricant where it is most needed.

The use of a phosphate undercoat combined with a compatible lubricant has not only opened new fields in the cold forming of steel, but has been applied in the tube drawing, wire drawing and deep drawing industries to improve existing techniques.

The vastly superior lubrication obtained by a phosphate system has made possible the cold extrusion of steel on a production basis. It is in this field, mainly devoted at the present time to the manufacture of ordnance components, that the greatest advantages are likely to be found in the future.

Schedule Wire Drawing Symposium in Australia

The Physical Metallurgy Division of the Melbourne Branch of the Australian Institute of Metals has arranged for a Symposium on the "Theory and Practice of Wire Drawing", to be held in Melbourne in November 1953. Seven papers have been contributed by Australian and English authors. They will be preprinted in booklet form and the preprints will be available to anyone outside Australia interested in contributing to discussion of the papers. Copies of the papers may be obtained by writing to: The Honorable Secretary, R. C. Gifkins, Baillieu Laboratory, University of Melbourne, Carlton N. 3, Victoria, Australia.

Compliments

To ALBERT EASTON WHITE, director of the Engineering Research Institute of the University of Michigan, on the biographical appreciation which constitutes the entire June 1953 issue of the *Engineering Research Institute News*. Prof. White was the first president of the American Society for Steel Treating (1920), which later became the American Society for Metals.

♦ ♦ ♦

To THEODORE E. OLT, director of the research laboratories, Armco Steel Corp., and to JOHN R. TOWNSEND, director of material and standards engineering, Sandia Corp., on their nomination to the board of directors of the American Society for Testing Materials.

♦ ♦ ♦

To BENJAMIN F. FAIRLESS, chairman of the board of directors, and chief executive officer of the United States Steel Co., on being awarded the Vermilye Medal by the Franklin Institute in recognition of his "outstanding contributions to the field of industrial management by further developing and unifying the great number of diverse units and industries within the structure of the U. S. Steel Co.", and for the honorary doctor of laws degree recently received from Knox College.

♦ ♦ ♦

To AMPCO METAL, INC. on being awarded an honorable mention in the 1953 Creative Competition of the National Advertising Agency Network for its product advertising in nonmerchandising business publications. The award was made for ads which appeared in *Metal Progress*.

♦ ♦ ♦

To G. A. LILLIEQVIST, research director and chief metallurgist, American Steel Foundries, on his award of the Steel Founders' Society of America national Technical and Operating Gold Medal for 1952; to JOHN A. RASSENFOSS, assistant research director, American Steel Foundries, on his award of the Steel Foundry Facts award for excellence of material published in the Society's technical publications; and to C. B. JENNI, chief metallurgist, General Steel Castings Corp., who was awarded second prize in the same category.

♦ ♦ ♦

To ERNEST H. KLEIN, manager, metal division, New Jersey Zinc Sales Co., on his recent election to chairman of the board of the Metal Powder Association.

♦ ♦ ♦

To NORMAN F. TISDALE, manager of sales, Molybdenum Corp. of America, on being awarded an honorary degree of doctor of laws by Queen's University in Kingston, Ont., Canada.

Puget Sound Winds Up Successful Lecture Course

Reported by H. L. Southworth
Boeing Airplane Co.

The final session of the 1953 educational program recently presented by the Puget Sound Chapter consisted of a panel discussion on "Nondestructive Testing of Metals".

Panel members, H. L. Southworth, J. E. Carton and V. I. Black, all of Boeing Airplane Co., presented talks and demonstrations on "Magnetic and Penetrant Methods", "Ultrasonic Testing" and "Industrial X-Ray" in which the various practical applications of these nondestructive methods were emphasized.

Both the attendance and the audience participation in the discussions indicated the large and growing interest in these methods of inspection and the increasing necessity of their application to quality control.

Describes History's Most Famous Jewels

Reported by A. D. Carvin
Joslyn Stainless Steels

The Fort Wayne Chapter's Ladies Night meeting was addressed by C. J. Beavers, assistant manager, Koerber Jewelers, who presented an interesting paper on the romances and intrigues of some of the "Famous Gems in History", after which he displayed a $50,000 gem collection, which was highlighted by a $38,000 uncut diamond.

Enthone Adds Space

Enthone, Inc., manufacturers and suppliers of chemicals for the metal finishing industry, has announced the completion of 6600 sq. ft. of increased manufacturing and warehousing facilities at their plant in New Haven, Conn.

Philadelphia Students Hear Stoughton

At the Third Annual Students' Night Held in Philadelphia in May, Bradley Stoughton (Left), Former Head of the Department of Metallurgy at Lehigh University, and Director of Lukens Steel Co., Spoke on "Some New Alloy Steels and Their Properties". With Prof. Stoughton are Ardrey M. Bounds, Superior Tube Co., chapter chairman, and A. W. Grosvenor, head of the department of metallurgy at Drexel Institute of Technology

Reported by Charles C. Mathews
J. T. Ryerson & Son, Inc.

At its third annual "Students' Night" the Philadelphia Chapter was honored to hear Bradley Stoughton speak on "Some New Alloy Steels and Their Properties". Prof. Stoughton, a former dean and head of the department of metallurgy, Lehigh University, is now a director of the Lukens Steel Co.

Prof. Stoughton pointed out that about 10% of all steel produced is alloy steel and this percentage has been steadily increasing during recent years. He further noted that 75% of this current alloy steel production goes into automobiles. The recent effort to conserve alloys has been eminently successful at International Harvester Co., where, in 1952, over 65% of nickel and molybdenum requirements were saved by the use of boron additions to alloy steel.

The speaker noted that the surface temperature of a jet plane traveling at 1400 mph. will rise to 450° F. Stainless steel and titanium alloys are currently being studied to replace the various aluminum alloys which have been used to cover airplanes for use at these high operating temperatures.

Permanent magnet steel, such as Alnico #5, high-silicon electrical and electromagnetic steel, toolsteels, use of cerium in sulfurized steel to improve physical properties of such steel, constructional alloys and the strength-weight factor, and steels for high-temperature service were discussed.

Prof. Stoughton mentioned that many of the alloys were used in very early times and in fact, alloy steels are almost as ancient as the origin of chemical warfare (about 4000 B.C.) when Egyptian ladies first started to use perfume.

Explains Growth in Bubble Froths

R. L. Fullman (Left), General Electric Research Laboratory, Who Spoke Before the Oak Ridge Chapter Recently, Explains to Anton deS. Brasunas, Technical Chairman, Some Results of His Experiments With Soap Bubble Froths

Reported by Richard E. Pawel
Graduate Assistant
University of Tennessee

Robert L. Fullman of the General Electric Research Laboratory addressed the Oak Ridge Chapter on the subject of "Grain Growth" via soap bubble froth analysis.

Dr. Fullman explained the results of experimentation with soap bubble froths from idealized concepts in an attempt to derive expressions for the behavior of the individual bubbles and for the whole array during both two and three-dimensional growth. For a given system, the growth behavior of a given single bubble was shown to be chiefly a function of the number of sides of the bubble, stability occurring when there are six sides for the case of ideal two-dimensional growth. If the bubble has more than six sides, it will tend to grow; for less than six sides, it will tend to shrink and disappear.

The speaker had several slides on hand from whose projection the growth of an enclosed froth could be seen. These "motion pictures", as seen from the slide projection, illustrated the phenomenon of bubble growth very well. However, there still seems to be appreciable discrepancy between ideal and actual behavior of the froths in two-dimensional growth, perhaps due to the difficulty in obtaining perfect two-dimensional systems.

During the discussion period, Dr. Fullman indicated that he hopes to start soon to investigate the relationship between the bubble froth growth analysis and continuous grain growth.

Describes Unusual Metals Now Being Used By Industry

Reported by Willard Roth
Design Engineer
Westinghouse Electric Corp.

"Unusual Metals in Industry" was the title of a talk presented to the Northwestern Pennsylvania Chapter by Bruce W. Gonser, assistant director, Battelle Memorial Institute. Dr. Gonser gave a brief sketch of Battelle and the scope of the research carried on there. He then introduced his subject with particular reference to those factors which largely determine whether or not a metal will be used—properties, ease of extraction, and abundance.

Dr. Gonser pointed out that 99.99% pure aluminum metal is moisture resistant, retains its luster, and can be used for reflectors and for jewelry. He mentioned the increased use of aluminum coatings on steels for heat resistance particularly.

Iron, with impurities of the order of 10 parts per million, shows much higher corrosion resistance and is much softer than normal low-carbon iron. Likewise, high-purity chromium has been produced and found to be relatively ductile and capable of some deformation at 50° C. or below, with slow deformation rates.

Magnesium, alloyed with around 3% thorium, has shown improved tensile properties at room temperature and considerable increase in creep strength at temperatures up to 300° C.

Dr. Gonser also pointed out that the so-called rare earth metals are really more plentiful in nature than the more commonly known metal nickel, that tungsten is now becoming more plentiful, with considerable amounts being stockpiled, and that it is probably the only unalloyed metal that successfully resists the action of molten and vaporized zinc.

He went on to state that uranium is too reactive to find much use as a metal, that cobalt and columbium continue to be scarce, with new sources being sought, that the semiconductors, particularly germanium, are in great demand for making transistors, that work is going on to produce purer silicon but with little hope of securing ductility, that molybdenum with a silicide coating has withstood oxidation in air at temperatures up to 2000° C, that nickel has proven to be the best cladding metal for molybdenum, that titanium production capacity will soon be 20,000 tons per year, and that parts made from sintered, fine aluminum powder are stronger at elevated temperatures than cast or rolled aluminum parts.

Mechanical Engineering Congress to be in Italy

The fifth International Mechanical Engineering Congress will be held in Turin, Italy, from Oct. 9 through 15, 1953, and will run concurrent with the Salone Internaziona della Tecnica, so that participants will be able to visit the exhibitions. The theme of this year's Congress will be "Production and Assembly Methods for Components in Mechanical Engineering". Further information may be obtained by writing to: International Mechanical Engineering Congress, Permanent Secretariat, 10, Ave. Hoche, Paris (VIII^{e}), France.

Gives Outlook of Iron Ore Picture

Reported by Andrew N. Eshman
Engineering Laboratory
North American Aviation, Inc.

D. I. Brown, technical editor, *Iron Age*, spoke on "Our Iron Ore Outlook" before a recent meeting of the Columbus Chapter. His talk, which was reported in detail in the April *Metals Review* (p. 19), covered the American iron ore situation from both a domestic and global viewpoint, and the latest developments in the Quebec-Labrador taconite program, and to a lesser extent, the Brazilian and Venezuelan ore picture.

Wyzalek Awards Presented by Chipman

Winners of the John F. Wyzalek Memorial Awards Presented Annually to High-School Students for Original Research on "Heat Treatment of Steel" Are Shown at the May Meeting of the New Jersey Chapter With John Chipman (Fourth From Left, Front Row), and W. C. Schulte, Chapter Chairman (to Dr. Chipman's Right)

Reported by John L. Everhart
Materials & Methods

Winners of the John F. Wyzalek awards given annually to high school students for original research reports on the "Heat Treatment of Steel" were announced at the May meeting of the New Jersey Chapter. William C. Schulte, Curtiss-Wright Corp., chapter chairman, read the names of the winners in each of the eight competing technical and vocational high schools and John Chipman, Massachusetts Institute of Technology, presented the awards.

Following the presentation and the installation of officers for the coming year, Dr. Chipman discussed the problems in "Meeting the Country's Need for Metallurgists". He outlined the over-all shortage of engineers which has been widely publicized during the past few years, noting, however, that enrollments in the engineering schools are on the up-grade, and indicated that efforts of various groups, including the A.S.M., are beginning to show results. However, the field of metallurgy is not as well known as other engineering fields and therefore only a small number of freshmen choose it for study. As a result, only about 2% of the students enrolled in engineering schools at present are specializing in metallurgy. To increase this percentage, it will be necessary for all metallurgists to publicize the field and indicate the opportunities found in it.

Dr. Chipman then discussed the work of the A.S.M. in this direction, mentioning the science awards, teacher awards, special courses in metallurgy being given for high-school teachers during the summer months, and the scholarships sponsored by the A.S.M. Foundation in all schools in the United States and Canada which have accredited curricula in metallurgy.

He concluded with a discussion of the modern conception of the field of metallurgical engineering.

Trinks Award to Carl Mayer, Jr.

A leading figure in the field of industrial heating, Carl F. Mayer, was one of four recipients of the annual Trinks Award for outstanding achievement in the industrial heating industry. Presentation was made May 5, at a dinner in the Duquesne Club, Pittsburgh, by an award committee that included John C. Warner, president, Carnegie Institute of Technology; Dr. W. Trinks, professor emeritus, Carnegie Institute of Technology; T. J. Ess of the Association of Iron and Steel Engineers; Carl L. Ipsen, of Industrial Furnace Manufacturers Association; and H. A. Strickland Jr., of Hotpoint Co.

Mr. Mayer, who is president of the Carl-Mayer Corp. of Cleveland, was selected for his design and engineering advancements in the industrial oven field. He is well known for his early development of steel insulated panel-type ovens, particularly in core and mold oven practice.

He was also cited for his pioneering development in industrial ovens, air heaters, furnaces and allied equipment for which he holds some 17 patents. More than 30 technical papers and articles have won him recognition as an international authority on industrial ovens.

Mr. Mayer is a native of Cleveland, received the B. S. degree in engineering at the University of Michigan. He is on the board of the Swartwout Co., and the advisory board, Smaller Business of America. He also served on the Industrial Advisory Board, War Production Board, and was a board member of the Industrial Furnace Manufacturers Association. He is a member of the Ohio Chamber of Commerce, the Wire Association, the National Association of Manufacturers, as well as the A.S.M.

Early A.S.M. Member Dies

Harry I. Askew, Detroit district manager of the Universal Division of the Universal-Cyclops Steel Corp., died suddenly in June. He was 62 years of age.

Mr. Askew was one of the first members of the American Society for Metals, and had spent 45 years in the steel business. He was with Crucible Steel Co. for 19 years.

Corrosion Failures Discussion in New York

Reported by I. M. Hymes
International Business Machines Corp.

The New York Chapter heard Raymond B. Hoxeng, research associate for the U. S. Steel Corp. talk on "Corrosion Failures" at their last meeting of the season. Dr. Hoxeng showed a fine set of slides depicting corrosion failures.

Dr. Hoxeng explained a common failing in the design of containers of corrosive materials. While material and design take good acount of the inside of the container, little effort has been made to prevent corrosion from the outside. Several failures which resulted from external corrosion were shown and described.

Twenty Years Ago
Quotes From *Metals Review*
March 1933

"Cleveland Chapter joined with the local section of the S.A.E. to hear Dr. KARL ARNSTEIN, the eminent designer of Zeppelins, give his version of the future of air transportation. . . Especially good were the films of the early Zeppelins.

Explains Atmosphere Control for Heat Treating Processes

Reported by Knox A. Powell
Research Engineer
Minneapolis-Moline Co.

The Minnesota Chapter heard Norbert K. Koebel, director of research for the Lindberg Engineering Co., speak on "Controlled Atmospheres for Heat Treating" at a recent meeting.

Atmosphere control for heat treating has been used since the time of the pharaohs of Egypt, Mr. Koebel stated. Carbon-rich atmospheres from controlled combustion, and atmospheres created by adding absorption materials like charcoal to reduce oxidizing elements, were general up through the first decade of this century. An oxide coating on the work itself protects against decarburization at lower temperatures but fails at the temperatures required for treating high speed steel.

Carbon dioxide and water vapor have been found to be the chief causes of decarburization. The charcoal carbon monoxide generator with condensation treatment to remove water vapor was introduced during the first world war. This, however, did not provide any corrective action to offset air infiltration, as when charging.

A moisture-free atmosphere generated by cracking methane-type gas over a catalyst at 2000° to 2100° F. then came into use. This atmosphere could be regulated by the addition of carbon-rich gas to raise, or water vapor to lower the carbon potential to obtain active equilibrium for any alloy at any temperature such that carburization or decarburization would return to normal. Equilibrium charts for the moisture content of atmospheres for most steels have now been prepared covering the heat treating range of temperatures.

Carburizing is generally done with an atmosphere made carbon rich up to the sooting point, after which the work is held in a neutral atmosphere to allow the carbon to penetrate and to reduce the case concentration to 0.8 or 0.9%. Deeper cases are secured with several successive cycles of carburization and soaking to avoid the self-limiting action of high-density absorption.

Mr. Koebel illustrated furnaces of new design with clever interlocks for charging and discharging work without contaminating the furnace atmosphere. Neutral atmosphere also protects during quench. Purging gas is heated to furnace temperature before it touches the work. The use of the process of quenching air hardened steels with a neutral atmosphere is increasing according to Mr. Koebel.

Cites Uses for Copper-Base Alloys

Reported by Joe Marx
Chief Inspector, Sheffield Steel Corp.

I. S. Levinson, manager, process industries department, Ampco Metal, Inc., spoke before the Texas Chapter on "Copper-Base Alloys as Materials of Construction". In addition to the excellent paper presented by Mr. Levinson, announcement was made of new officers and this year's chairman, M. W. Phair, was presented a past-chairman's certificate.

I. S. Levinson

Mr. Levinson stated that the copper industry had been lagging behind several of the other metal-producing industries, as far as materials of construction are concerned, but that through extensive research and development work over the past few years, copper-base alloys were rapidly finding their way into many new uses. Work is now being done on finding new stabilizing elements. The principal alloying elements that are presently being used are: zinc, nickel, tin, iron, aluminum, phosphorus, manganese, lead and beryllium. By varying the amounts of these alloying elements, the physical properties can be varied greatly. Beryllium-copper and chromium-copper exhibit high conductivity and high-fatigue strength and are used extensively in the electrical industry.

Several of the correct and incorrect applications of copper and its alloys were outlined, as follows:

(1) In installations where high velocities are encountered, copper will not withstand the high velocities as well as some of the other alloys.

(2) The discoloration of material being treated in copper vessels is always an important factor to consider. The same holds true for "copper pickup".

(3) Copper alloys can be used successfully up to 1000° F., but they are not normally used at extremely high temperatures and pressures.

(4) Pure copper can be extruded and sharp-cornered shapes made.

(5) Copper alloys are excellent for cold heading and are being used quite extensively in the screw and bolt industry, as well as for pump bodies, sucker rods, liners, pipe fittings, and centrifugal separators.

(6) Copper and bronze can successfully be welded to the stainless steels. However, the welding and joining of copper-base alloys has been a difficult problem to overcome. Shielded arc welding is one of the factors that has enabled the metallurgists to overcome this problem.

Home Economist Featured in Chicago

Neva Skoog, Field Home Economist at the Hotpoint Co., Was the Guest Speaker at the Ladies Night Meeting Held Recently in Chicago. Miss Skoog gave a cooking demonstration and presented two colored movies, one on the newest home laundries, and the other glamorizing the all-electric kitchen. Shown with Miss Skoog are, left, Otto Zmeska, chairman, and Tommy Simms, technical chairman. (Reported by B. S. Myers)

New Haven Hears Talk on Titanium

Norman L. Reed (Center), Industrial Staff Consultant, Watertown Arsenal, Spoke on "Titanium" at the New Haven Chapter's Sustaining Members Night Meeting. Shown with Mr. Reed are, left, C. B. Christensen, chairman, and H. L. Burghoff, technical chairman (Photo by J. L. Baker, Seymour Mfg. Co.)

Reported by Glenn F. Whiteley
Metallurgist, Heppenstall Co.

Norman L. Reed, industrial staff consultant, Watertown Arsenal, discussed "Titanium: Current Status and Future Prospects" at the Sustaining Members' Night meeting of the New Haven Chapter.

The speaker described briefly the methods of making titanium and pointed out that its high strength-weight ratio is very important in all cases where titanium is considered for use. This is particularly true in ordnance uses.

He presented figures showing the tremendous increase in production and use of this light but strong metal over the last several years, and discussed the properties and characteristics of the metal and its alloys, methods of working both hot and cold, machining processes and fabricating techniques.

In concluding his talk, the speaker suggested several possible uses for the new metal and commented on its future prospects in engineering.

Northwest Circuit Hears Krivobok On Properties of Metals

Reported by H. L. Southworth
Boeing Airplane Co.

Vsevolod N. Krivobok, head of the stainless steel section of the development and research division of International Nickel Co., recently completed the Northwest Circuit tour, having presented his talk, "Properties of Metals at Elevated Temperatures and the Factors Influencing Such Properties" before the British Columbia, Oregon, Inland Empire, Columbia Basin and Puget Sound Chapters.

Dr. Krivobok pointed out that an impressive amount of scientific and engineering effort has been expended in this field, but as yet the work is still far from finished. Many factors, including those of processing, influence expected properties so that the merits of an alloy and final design for its use must still be evaluated by checking its performance in service. The effects of simultaneous pressure of high temperature and stress were cited as examples of factors which influence—over a long period of time—the properties of alloys.

High-temperature alloys can be generally classified as iron, nickel or cobalt base and, using this classification, Dr. Krivobok discussed in detail not only the metallurgical factors that effect the properties of such alloys but also the effects of such factors on maintenance of the original properties of a material in service.

With the exception of iron-base alloys, most of the materials are precipitation hardening. Alloy additions are made for various reasons: to add strength to the matrix; to change the solubility of hardening elements; to influence the stability of the major constituent — austenite; to influence size and distribution of the precipitant; and to control grain size. Dr. Krivobok discussed the effects of variations in these factors on such important engineering properties as creep and rupture strength, and illustrated how small variations often exert a large influence which may not be predictable. Properties of alloys during service are also greatly affected by prior history of fabrication and heat treatment even though variations may result in alloys with essentially equal room temperature properties.

For inspection purposes, there is urgent need to find a simple and quick test, preferably at room temperature, which would correlate with high-temperature performance. Hopes for such a test are remote, however.

THIRTY YEARS AGO

FREDERICK J. GRIFFITHS† was elected president of the Central Steel Co. in the spring of 1923. According to the announcement, "other changes in the Central organization include the election of . . . J. M. SCHLENDORF as vice-president in charge of sales, (now in the same capacity for Republic Steel Corp.) and B. F. FAIRLESS as vice-president in charge of operations (now chairman of the board of United States Steel Corp. and an honorary member of the American Society for Metals).

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Reviewing the A.S.M. national convention and exposition held in Detroit in 1922, the magazine *Chemical & Metallurgical Engineering* editorialized as follows: "Steel treaters have done something which is perhaps unparalleled in the history of American technical societies—they have held a national convention at which 40% of their entire membership enrolled was present. . . They were rewarded by the best meeting and exposition the American Society for Steel Treating has ever had. . ."

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Winners of the first Henry Marion Howe Medal were announced in November 1922. Rules for the award had not yet been definitely formulated, and two medals were given that year, one gold and the other silver. The gold medal was presented to E. J. JANITZKY of Illinois Steel Co. (now U. S. Steel) for his paper on "A Contribution to the Problem of Influence of Mass in Heat Treatment".

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The silver medal went to J. P. GILL and L. D. BOWMAN, metallurgists for Vanadium-Alloys Steel Co., for their paper on "Metallography of High Speed Steel". (Both are still with Vanadium-Alloys, Mr. Gill—a former A.S.M. national president—as executive vice-president of the company, and Mr. Bowman as vice-president of operations at the company's Latrobe plant.)

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The introduction to a paper on "Salt Baths for Heat Treating" by SAM TOUR, metallurgist, Doehler Die Casting Co. (now chairman of the board of Sam Tour & Co., New York), states that: "The work [done by the writer on the subject] is not complete and a solution of the problem of finding a salt or salts which are satisfactory for the various heat treating operations has not up to the present time been found."

† Deceased.

Stresses Improvements in Machinability

Francis W. Boulger, Battelle Memorial Institute, Spoke on "Machinability of Steel" at a Meeting in Rochester Recently. Shown above are, from left: Ermanno A. Basilio, chief metallurgist, General Railway Signal Co.; Richard F. Eisenberg, assistant professor of metallurgy, University of Rochester; Mr. Boulger; Robert S. Guinan, assistant metallurgist, Eastman Kodak Co., Camera Works; and Robert J. Barr, Rochester Steel Treating Works

Reported by Lacy M. Smith
Eastman Kodak Co.

Past and present knowledge of the art of testing and evaluating the machinability of steels were discussed by Francis Boulger of Battelle Memorial Institute, in a talk on "Machinability of Steel" in Rochester.

Tests have shown that evaluation of machinability on various machine operations (drilling, sawing, milling, etc.), may result in different machinability ratings. Furthermore, mechanical properties such as hardness or tensile strength are not reliable in indicating machinability.

Machining tests have shown that high speed (SFM) results in high temperatures at the tool edge. Doubling the machining rate by increasing speed results in a 200° F. increase at the tool edge, while doubling the feed to accomplish the same purpose raises the temperature 100° F. Lower temperatures at the tool edge are associated with increased tool life—hence, increased machining rates are usually obtained by increasing feed.

At present, friction-type machinability tests with a machine resembling a lathe and using constant feed pressures are being conducted. The time required to cut a specified length is a measure of machinability. Results of this test correlate with tool life tests and have largely reduced time and expense. For free machining steels of comparable chemistry and condition, steel having the largest inclusions has the best machinability.

Wear and Wear Testing Topic at Springfield

Reported by Howard E. Boyer
Chief Metallurgist
American Bosch Corp.

A talk on "Wear and Wear Testing" was presented by Arthur E. Focke, manager, materials development aircraft nuclear propulsion project, General Electric Co., in Springfield.

Dr. Focke defined wear as the undesired gradual change in dimensions of a metal part by abrasion, cutting, galling, pitting or corrosion. To minimize wear he advocates keeping surface stresses as low as possible, designing for full fluid lubrication, and keeping out abrasive particles.

Abrasion, which results from the scrubbing action of extraneous particles, can be minimized by keeping the hardness of the metal at the actual operating temperature higher than that of the abrasive. Galling resulting from cold welding of two contracting surfaces may be minimized by suitable lubricants or surface films, and in some cases, by employing dissimilar metals which tend to weld less readily. Pitting, a fatigue phenomenon resulting from high-localized alternating stresses at or just below the surface, can be minimized by keeping the surface stress as low as possible and using harder materials. Wear from corrosion may be minimized by proper selection of materials after the application has been studied.

Wear is a problem in mechanical metallurgy which can be solved by thoroughly analyzing the problem to segregate probable factors and by arranging wear tests best suited to a specific situation.

Speakers at Indiana Symposium

Speakers at the Fifth Anniversary Spring Symposium of the Combined Indiana Chapters of the A.S.M. Were, From Left: Arthur E. Focke, General Electric Co.; John R. Willard, Aluminum Co. of America; James B. Austin, U. S. Steel Co.; and Arthur R. Lytle, Union Carbide & Carbon Research Labs

Reported by A. D. Carvin
Joslyn Mfg. & Supply Co.

The Fifth Anniversary Spring Symposium of the combined Indiana Chapters of the American Society for Metals held at Purdue University presented a series of lectures on "Modern Physical Metallurgy".

Arthur E. Focke, director of materials development, aircraft nuclear propulsion project, General Electric Co., spoke on the "Evolution of Physical Metallurgy". His lecture showed the extent to which physical metallurgy has evolved from an art to a science in the last quarter century, with particular emphasis on the development of the concept of quantitative hardenability and the need for continued study.

John R. Willard, manager, sales engineering and development division, Aluminum Co. of America, spoke on "Aluminum—Today and Tomorrow". He discussed the aluminum production figures and markets in 1939, the last year not greatly affected by World War II, figures of the present, and those of the 1960-1970 era.

Arthur R. Lytle, director of research, Union Carbide and Carbon Research Laboratories, spoke on "The Present and Future of Ferrous Metals". He covered the current picture of ferrous metals with respect to the utilization of the various types of steel, and the indicated future possibilities for these metals.

James B. Austin, president-elect of the American Society for Metals, and director of research, U. S. Steel Co., technical chairman, concluded with a summary of the physical metallurgy picture at the present time.

A. S. M. Review of Current Metal Literature

An Annotated Survey of Engineering, Scientific and Industrial Journals and Books Here and Abroad Received During the Past Month

Prepared in the Library of Battelle Memorial Institute, Columbus, Ohio

Stewart J. Stockett, Technical Abstracter

Assisted by Claudia Carter, Ardeth Holmes, Norma King and Members of the Translation Group

A GENERAL METALLURGICAL

135-A. Visual Aids. L. G. Ekholm. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 287-290.
Methods of training openhearth personnel. (A6, D2)

136-A. Training Program, South Works. M. F. Yarotsky. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 291-293; disc., p. 293-294.
Outline of a proposed training program for first helpers. (A6, D2)

137-A. Training Open Hearth Personnel at the Ford Motor Company. C. W. Conn. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 295-301.
Need for training programs, how they are planned, and the type of subject matter presented. (A6, D2)

138-A. Training Program for Furnace Personnel, Ohio Works, U. S. Steel Company. E. E. McGinley. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 302-303.
Outline of discussion program. (A6, D2)

139-A. Training Program for Open Hearth Employees, Jones and Laughlin, Pittsburgh Division. H. L. Tear. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 303-304.
General discussion of program which includes lecture and discussion meetings for workers. (A6, D2)

140-A. Training Open Hearth Personnel. A. H. Osborne. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 305-306; disc., p. 306.
Projects in personnel training. (A6, D2)

141-A. Some Canadian Developments in Metallurgy. A. F. Cadenhead. *Canadian Metals,* v. 16, May 1, 1953, p. 24-25.
Review of some of the major developments that took place during 1952 in the field of metallurgy. (A general, Al, Ti, Ni, Cu)

142-A. Buick Washes Away Waste Problem. Herbert Chase. *Industry and Power,* v. 64, May 1953, p. 67.
Disposal of foundry wastes. Photographs. (A8, E general)

142-A. The European Zinc Industry. R. Lewis Stubbs. *Metal Bulletin,* Apr. 28, 1953, p. 7-11; May 1, 1953, p. 16-18.
Development, present situation, and prospects. Tables. (A4, Zn)

143-A. The Outlook for Copper, Lead, and Zinc. Clyde Williams. *Monthly Business Review,* v. 35, May 1953, p. 8.
Future needs of Cu, Pb, and Zn and their possible replacement by Al, Mg, iron, steel, and/or plastics. (A4, Cu, Pb, Zn, Al, Mg, Fe, ST)

144-A. Dust Collection Is "Big Business" at Norton Company. A. F. Hardy, Jr. and W. J. Samborski. *Plant,* v. 7, May 1953, p. 61-63.
The objectives and some of the procedures of efficient dust collection in the manufacture of grinding wheels and abrasives. Shows how average dust-count of less than 5 million particles per cubic foot is achieved through proper selection of equipment, adequate design of dust hoods, automatic cleaning cycles, and an extensive program of preventive maintenance. Photographs. (A5)

145-A. Non-Ferrous Scrap Recovery. A. J. Cripps. *Australasian Engineer,* Mar. 1953, p. 59-62; disc., p. 62-65.
Sources of scrap and recovery methods for Al, Cu, Pb, and Zn alloys. (A8, Al, Cu, Pb, Zn)

146-A Development of Special Pumps for Liquid Metals. Their Power Supply, Valves, Bearings, and Instrumentation. Edward F. Brill. *Mechanical Engineering,* v. 75, May 1953, p. 369-373.
Electromagnetic and mechanical pumps. (A general)

147-A. Disposal of Plating Room Wastes. V. Treatment of Cyanide Waste Solutions by Ion Exchange. Charles A. Walker and Walter Zabban. *Plating,* v. 40, Feb. 1953, p. 165-168; Mar. 1953, p. 269-278.
Nature of ion exchange, reviews previous work, apparatus, analytical procedures, and reagents. Extensive tables. (A8, L17)

148-A. (English and French.) Changes in the World Iron and Steel Industry, 1929-1952. *Monthly Bulletin of Statistics, United Nations,* v. 7, May 1953, p. vii-xvi.
Data pertaining to world production and consumption. Tables, graphs. (A4, CI, ST)

149-A. (German.) Occupational Skin Eczema in Electroplating Work and Its Prevention. Wilfried Kohl. *Metalloberfläche,* v. 7, ser. B, no. 1, Jan. 1953, p. B1-B2.
The disease and preventive measures. (A7, L17)

150-A. (German.) Importance and Output of the German Nonferrous Metal Industry. H. Sennekamp and A. Vath. *Zeitschrift für Metallkunde,* v. 44, no. 1, Jan. 1953, p. 2-7.
An economic appraisal emphasizing productivity, capacity, further standardization, and research. Tables. (A4, EG-a)

151-A. Advances in Chemical Metallurgy. A. F. Cadenhead. *Canadian Chemical Processing,* v. 37, May 1953, p. 38, 40.
Advancements in recovering products from wastes. (A8)

152-A. Spheroidal-Graphite Iron up to Date. W. W. Braidwood. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B94-B105; disc., p. B105-B107.
Surveys progress of the development of spheroidal-graphite iron, determines position now reached, and presents forecast of its future. Micrographs, photographs. 31 ref. (A4, CI)

153-A. The Crisis in Metals. F. L. Church. *Modern Metals,* v. 9, May 1953, p. 69-74, 76-78, 80.
Economic decline of Zn and Pb. Views of leading men in the industries. (A4, Zn, Pb)

154-A. (French and German.) Copper and Health. *Pro-Metal,* v. 6, no. 32, Mar. 1953, p. 139-147.
Applications for Cu. Concludes that it can be used generally without endangering health. Photographs, tables. (A7, Cu)

155-A. Reduction of Plating Waste Losses by Reclaim Tanks. C. F. Hauri. *Sewage and Industrial Wastes,* v. 25, May 1953, p. 586-590.
Mechanical methods in which procedures reduce amount of cyanide reaching the sewer effluent. Diagrams. (A8, L17)

156-A. (French.) Tungsten and Wolfram. L. Perruche. *Metaux Corrosion-Industries,* v. 28, no. 330, Feb. 1953, p. 82-86.
Sources, world markets, and uses of W. (A4, T general, W)

157-A. (Book). Statistical Yearbook. Statistical Office of the United Nations. 554 pages. 1953. Columbia Univ. Press. $7.50.
Contains a collection of world statistics of interest to metallurgists and mining engineers. Production, consumption, and industrial growth are presented in table form. Minerals and metals are treated individually and by nation. (A4)

158-A. (Book—German.) (Chemical Technology. Metallurgy/General.) Chemische Technologie. Metallurgie/Allgemeines. Karl Winnacker and Ernst Weingaertner. 846 pages. 1953. Carl Hanser Verlag, Munich, Germany.
Includes chapters on ore dressing, alkali metals, industrial production

The coding symbols at the end of the abstracts refer to the ASM-SLA Metallurgical Literature Classification. For details write to the American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

of Mg, nonferrous heavy metals, and protection of metallic surfaces. (A general)

159-A. (Book—German.) **(Fundamentals of Metallurgy.) Grundlazen der Metallurgie.** Ch. K. Awetissjan. 242 pages. 1951. Verlag Wilhelm Knapp, Halle (Saale), Germany. (Translated from the Russian by Friedrich Krantz.)

Fundamentals for the student and practicing metallurgist. Elements of metallography; physical and chemical processes in metallurgy; and fundamentals of wet metallurgical processes. (A general)

160-A. (Book—German.) **("Ironworks" Handbook for Plant Engineers.) "Hütte" Taschenbuch für Betriebsingenieure. Ed. 4.** Hans Rögnitz, editor. 426 pages. Verlag Von Wilhelm Ernst & Sohn, Hohenzollerndamm 169, Berlin-Wilmersdorf, Germany. 36 Dm.

Materials; production methods; metallic and nonmetallic substances. Processes include casting, forging, cold pressing, welding, and all machining methods. Surface treatments are enameling, plating, and anodizing. (A general)

B

RAW MATERIALS AND ORE PREPARATION

97-B. Effect of Molten Aluminum on Alumina-Silica Refractories. K. J. Brondyke. *American Ceramic Society, Journal,* v. 36, May 1953, p. 171-174.

All commercial alumina-silica refractories were found to be wetted and subsequently penetrated on exposure to molten Al. Shows that penetration and Si pickup by Al was independent of porosity, grade of refractory, and source of refractory material. Graphs. (B19, C21)

98-B. Self-Fluxing Sinter. John Poast. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 101-106; disc., p. 106-110.

Investigation on production and use of self-fluxing sinters from Lake Superior ores. Tables. (B16, Fe)

99-B. The Value of Test Ovens in a Program of Coal and Coke Research. C. L. Potter. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 159-173; disc., p. 173-177.

Presents data from three test ovens to demonstrate how proper use of test-oven results can be of material value to the byproduct coking industry and shed some light on the fundamental processes of carbonization. Graphs, tables, photographs. (B18)

100-B. The Overall Efficiency of Coal Washing. J. D. Price. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 190-198; disc., p. 198-201.

Over-all economic efficiency of the complete cycle of mining, preparing, and utilization of coal. Graphs, tables. (B18)

101-B. A Greenawalt Sintering Plant. J. A. Poll. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 214-221; disc., p. 221-228.

Plant to agglomerate magnetite concentrate. Photographs. (B16, Fe)

102-B. A Practical Application of Ore Sizing. William R. Kerr. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 229-236; disc., p. 237-241.

How to prepare and beneficiate variable, dense magnetite ore containing a relatively high percentage of S so that it could be reduced efficiently in the furnace and produce suitable hot metal for openhearth. Graphs, tables. (B12, D1, Fe)

103-B. Uranium Soars to Prominence in South Africa's Gold Fields. *Engineering and Mining Journal,* v. 154, May 1953, p. 72-76.

Geologic distribution of U, mining company activities, H_2SO_4 production, leaching and precipitation plants, and capital expenditures. Photographs. (B10, U)

104-B. Slime Coatings. How to Explain and Control Them. Adrian C. Dorenfeld. *Engineering and Mining Journal,* v. 154, May 1953, p. 87-91.

Investigation of $BaSO_4$, $SrSO_4$, $CaSO_4$, $PbSO_4$, and $PbCO_3$ slimes on galena, pyrite, and syphalerite. Micrographs and tables. (B14, Pb, Fe, Zn)

105-B. Beneficiation of Low Grade Chrome Ore From Arsekere, Mysore. S. K. Banerjee and P. I. A. Narayanan. *Journal of Scientific & Industrial Research,* v. 12A, Mar. 1953, p. 136-138.

Investigation to improve low-grade ore to about 48% Cr_2O_3 which is desirable for marketing purposes. Tables. (B14, Cr)

106-B. Iron Ore Preparation. Operations Prior to Blast Furnace Smelting. D. D. Howat. *Mine and Quarry Engineering,* v. 19, May 1953, p. 144-149.

Beneficiation operations, crushing, secondary crushing, drying, calcining, bedding and reclaiming of ores; and agglomeration of fines. Photographs. (B13, B14, Fe)

107-B. Tennessee Copper Explores Use of Rock Grinding Media. F. M. Lewis. *Mining Engineering,* v. 5, May 1953, p. 491.

Results of tests on marble grinding media. (B13)

108-B. How Humphreys Spiral Concentrator Is Used in Modern Ore Dressing Practice. Judson S. Hubbard, I. B. Humphreys, and Whitman E. Brown. *Mining World,* v. 15, May 1953, p. 40-45.

How different companies utilize the spiral concentrator. Photographs, diagrams. (B14)

109-B. Eagle Mt. Iron Mine Expansion. *Mining World,* v. 15, May 1953, p. 53-54.

New plant and equipment for ore beneficiation. (B14, Fe)

110-B. Nodulizing. N. V. S. Knibbs and E. G. S. Thyer. *Pit and Quarry,* v. 45, May 1953, p. 114, 120, 122-123.

The process and its advantages, applications and commercial use of nodulizing finely-divided materials in processing ores and minerals. (B16)

111-B. (German.) **Granulation of Pig Iron in the Iron and Steel Works of Watenstedt.** Fritz Albrecht. *Stahl und Eisen,* v. 73, no. 6, Mar. 12, 1953, p. 335-337.

Type, importance, and applicability of granulated pig iron. Pilot and production plants and their methods of operation. Diagrams. (B22, CI)

112-B. Screen Analyses and Gravity Concentration of Tin Ore From Greenbushes, W. A. Evan E. Hughes and C. H. Meharry. Commonwealth Scientific and Industrial Research Organization and Kalgoorlie School of Mines, Western Australia, Report 485, Apr. 24, 1952, 3 p.

Tests on coarse lateritic material. (B13, B14, Sn)

113-B. Production of a Sulphide Concentrate From Ore and Mill Tailings from Hill 50 Gold Mine (N. L.), Mount Magnet, W. A. Arnold Griffin and Evan E. Hughes. Commonwealth Scientific and Industrial Research Organization and Kalgoorlie School of Mines, Western Australia, Report 489, May 28, 1951, 10 p.

Series of tests made to determine possibility of producing a sulphide concentrate suitable for acid manufacture. (B general, B22, Au)

114-B. Concentration of Gold Ore From the Mother Lode Mine, Ravenswood, Queensland. K. S. Blaskett and H. H. Dunkin. Commonwealth Scientific and Industrial Research Organization and the Univ. of Melbourne, Investigation 404, Oct. 26, 1951, 5 p.

Tests made to determine the best method for recovering Au. (B14, Au)

115-B. (German.) **Effect of O_2 on Sulfide Ores at Raised Pressure.** Herbert Neuhaus and Franz Pawlek. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 6, no. 2, Feb. 1953, p. 41-44.

Reaction mechanism of sulfatizing roasting, treatment of pulverized heavy metal sulfides with O_2 at 300° C., leaching with H_2O or dilute H_2SO_4. Research results on solubility of Fe, Zn, galena, and other complex sulfides are included. (B14, B15, Zn)

116-B. (Book—German.) **(Methods of Ore Preparation.) Leitfaden der Erzaufbereitung.** Gerth, Salzmann, and Hamann. 239 pages. 1952. Verlag Bonner Universitäts-Buchdruckerei. Gebr. Scheur GmbH., Bonn, Germany.

Chapters on crushing, classification, sorting, siderite roasting, water supply, ore dressing systems, and dust-control measures. (B13, B14, B15)

C

NONFERROUS EXTRACTION AND REFINING

76-C. The Mechanism of Cyanidation. J. R. Lambert. *Canadian Mining Journal,* v. 74, Apr. 1953, p. 57-64.

Examines chemistry of Au cyanidation from the standpoints of polymerization and electron chemistry. Diagrams and tables. (C24, Au)

77-C. Asarco Rehabilitates Copper Refinery. Perth Amboy Plant Improves Operating Efficiency and Employee Morale. G. H. Weis, D. A. Busch, H. K. Spaulding, and G. B. Paulding. *Journal of Metals,* v. 5, May 1953, p. 616-623.

Complete rehabilitation of the refinery. Photographs. (C21, Cu)

78-C. Operations at New Cornelia Copper Smelter of Phelps Dodge Corporation. James W. Byrkit. *Journal of Metals,* v. 5, May 1953. *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 633-642.

Design features and operating methods at the new Ajo smelter. Shows that successful operation of a novel method of handling and charging wet concentrates to a deep bath-type reverberatory furnace contributes to daily production of 200 tons of anodes with good results from the standpoint of both metallurgy and economy. Tables, photographs and diagrams. (C21, Cu)

79-C. Note on Contamination of Silicon Ingots. G. Sandoz and H. E. Stauss. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 653.

Briefly discusses possibility that a melt may be contaminated by a material not in direct contact with it, by means of gaseous intermediate agents. (C21, Si)

80-C. Ion Exchange. Another Tool for Hydrometallurgy. *Mining Engineering,* v. 5, May 1953, p. 494.

Development, present applications, and possibilities. Process for recovery of gold from cyanide solutions by exchange. (C24, Au)

81-C. The Preparation of Samarium and Ytterbium Metals. A. H. Daane, D. H. Dennison, and F. H. Spedding. *Ameircan Chemical Society, Journal,* v. 75, May 5, 1953, p. 2272-2273.

Describes procedure.
(C general, Sm, Yb)

82-C. An Early Method of Vacuum-Melting Tantalum. M. Pirani. *Vacuum,* v. 2, Apr. 1952, p. 159-160.

Historical comments on production and use of Ta metal. (C25, Ta)

83-C. (French.) Methods for Preparing Pure Scandium. Vasudeva Kilara Iya. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 236, no. 6, Feb. 9, 1953, p. 608-610.

Powdered thortveitite was heated in an excess of C to form Sc carbides, which are in turn decomposed by HCl. The ScO obtained is purified either by a double treatment with NH_3 or by ionic exchange.
(C general, Sc)

84-C. (German.) Continuous Recovery of Pure Ce Compounds in a Countercurrent Extraction Column. Rudolph Bock and Karl-Heinz Meyer. *Chemie Ingenieur Technik,* no. 3, 1953, p. 141-142.

Apparatus for extraction of Ce^{+4} from HNO_3 solution of cerite earths.
(C general, Ce)

85-C. Ion Exchangers and Industry. Garson A. Lutz. *Battelle Technical Review,* v. 2, June 1953, p. 58-62.

Shows that ion exchange provides efficient and economical means for carrying on numerous manufacturing processes. Improvements in ion exchangers and their applications offer possibilities for wider uses in industrial, medical, and other fields. Use of ion-exchange methods for separation and reclamation of metals. Diagrams. (C28)

86-C. Alloy Pigs From Hogged Fuel. *Chemical Engineering,* v. 60, June 1953, p. 122, 124.

New electric smelting technique which uses lumber mill wastes to control temperature and produces metals from "unsmeltable" ores easily and cheaply. (C21, A8, S16, AY)

87-C. Developments in the Aluminium Reduction Industry. James Franses. *Industrial Chemist,* v. 29, May 1953, p. 214-219.

General requirements for the production of Al. A multi-anode reduction furnace. Technical developments in the industry are considered in some detail. Probable trends for future expansion indicated. Diagrams, photographs. (C22, Al)

88-C. Investigation of Treatment Difficulties at Retreatment Plant, Kookynie. Arnold Griffin, C. H. Meharry, and R. A. Hobson. Commonwealth Scientific and Industrial Research Organization and Kalgoorlie School of Mines, Western Australia, Report 532, May 8, 1952, 13 p.

Various cyanidation, leaching, and scheelite recovery tests on dump material. Tables. (C24, B14, Au)

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FERROUS REDUCTION AND REFINING

138-D. Coke Oven Gas as a Supplementary Open Hearth Fuel. Richard D. Bundy. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 32-53.

Tests and results. Previous difficulties of using irregular amounts of low-pressure gas were overcome by the use of a suitable burner, maintenance of a gas-line pressure of 13.5 psi., and a minimum firing rate of 30,000 cu. ft. per hr. Graphs, tables, and photographs. (D2)

139-D. Checker Maintenance to Increase Flame Intensity. L. A. Hovey. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 54-56; disc., p. 56-59.

Problems of checker volume; amount of air available relative to fuel input; insulation and sealing; and cleanliness of checkers. (D2)

140-D. Use of Oxygen for Flame Enrichment and Decarburization, Inland Steel Company. A. M. Kroner. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 59-65.

Expansion and development of installations for the use of O_2. Tables and photographs. (D2, B22)

141-D. Oxygen for Increasing Open Hearth Production, Gary Steel Works. Wiley C. Buford. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 66-70; disc., p. 70-71.

Use of O_2 for decarburization to obtain increased production from existing facilities. Graphs. (D2, B22)

142-D. Scrap Preparation and Influence of Distribution Methods on Charging Time. William F. Bowers. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 72-74.

Shows that by proper scrap preparation and close coordination of distribution methods, charging time at the openhearth can be materially decreased. (D2, B22)

143-D. Decreasing Charging Time by Preparing Scrap. Vernon W. Jones. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 75-77; disc., p. 77-79.

Scrap-preparation program.
(D2, B22)

144-D. Rammed Fantails for Open Hearth Furnaces. R. R. Fayles. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 80-86.

Rammed installation, objectives of change, and improved performance. Diagrams and photographs. (D2)

145-D. Plastic Refractories in Nose and Fantail of Slag Pockets on Open Hearth Furnaces. W. E. Haberthur. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 87-88; disc., p. 88-90.

Installation and results. (D2)

146-D. Construction of Open Hearth Flues. J. C. Witherspoon. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 90-92.

Details of construction and results of using refractory concrete. (D2)

147-D. Concrete Refractories for Open Hearth Flues. R. E. Wright. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 92-93; disc., p. 93-94.

Construction. (D2)

148-D. Survey of Zebra Roofs in Use in the United States and Canada. T. H. Harley. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 94-97; disc., p. 97.

Survey made to determine extent, type, and results of the use of zebra roofs employed up to the present time. (D2)

149-D. Recent Experience With Rammed Hearths at Bethlehem. H. M. Kraner. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 97-102.

Graphic information on the performance of several high-magnesia openhearth bottoms. (D2)

150-D. Comments on Rammed Bottoms. W. E. Brandt. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 103-104.

Compares rammed to sintered bottoms. (D2)

151-D. Scheduling and Planning Furnace Repairs. J. L. Walton. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 104-105.

Shows that planning repair programs two months in advance increases production and efficiency. (D2)

152-D. Scheduling Open Hearth Rebuilds. J. O. Dague. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 106-110; disc., p. 110-113.

Schedule which covers every detailed operation of a repair job, from the time the furnace is tapped to the time the fuel is turned on. (D2)

153-D. Linings for Hot-Metal Mixers. R. E. Aikins. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 114-116.

Results experienced under actual operating conditions. (D2)

154-D. Refractory Lining for Hot-Metal Mixer. F. R. Smith. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 116-117.

Efforts to prolong life of hot-metal mixer lining. (D2)

155-D. Conservation of Alloys. D. L. McBride. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 118-128.

Conservation of Ni and Mn.
(D2, B22, Ni, Mn)

156-D. Use of Exothermic Alloys. C. C. Brown. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 129-131.

Reviews uses and applications in steelmaking. Tables. (D2, Mn, Cr)

157-D. Methods of Adding Boron to Open Hearth Heats. E. W. Pierce. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 132-133; disc., p. 133-135.

Method and effects of adding boron. (D2, B22, B)

158-D. Manganese for the Steel Industry—a Review. Francis W. Boulger and Russell C. Buehl. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 135-138; disc., p. 138-139.

Review of Mn recovery methods. 10 ref. (D2, Mn)

159-D. Use of Manganese Sulphide to Improve Hot-Workability. S. Feigenbaum. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 139-140; disc., p. 140-141.

Improved rolling characteristics of free-machining steels when S is added in the form of manganese sulfide. (D2, CN)

160-D. Effect of Manganese Sulphide and of Stick Sulphur on Surface Quality of Steel. Delmar R. Bessler. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 141-142.

General discussion on resulfurized steel. (D2, CN)

161-D. Open Hearth Bath Deoxidation. M. Tenenbaum. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 166-172; disc., p. 173.

Reviews changes occurring during bath deoxidation in order to determine what factors were responsible for persistence of the practice in spite of objections to its use. Tables. 7 ref. (D2)

162-D. Slag Control in Cold Metal Practice With the Use of Burnt Lime. Wilt H. Steinheider. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 174-187; disc., p. 188-189.

Effect of slag chemistry on slag patties and the changes the slag makes on individual heats. Graphs, tables, and photographs. (D2)

163-D. Economics of the Use of Oxygen With a Cold Charge. A. H. Sommer. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 190-194.

Economics of the use of O_2 by saving time and fuel when normal furnace operations can supply enough steel to satisfy normal rolling-mill requirements. Graphs. (D2)

164-D. Oxygen Lancing Practice in Cold Metal Shops. Alex Bigar, Jr. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 195-198; disc., p. 198-200.

Use of O_2 as an aid in increasing the output of steel from openhearth furnaces conducted on an experimental basis. Tables. (D2, B22, ST)

165-D. Effect on Production of High Percentage of Pig Iron (+40 Per Cent) in Cold Metal Practice. A. R. Edwards. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 200-201; disc., p. 201-202.

General discussion of effect. Tables. (D2, B22)

166-D. Supercharging a Battery of Open Hearth Furnaces. Albert Calderon. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 212-220; disc., p. 220.

Mechanics of system, component parts, charging cycle, and savings. Diagrams. (D2)

167-D. New Developments in Burners for Liquid or Combination Liquid and Gaseous Fuels. W. H. Kahl. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 221-226.

Data on mixed-fuel practices. Tables. (D2)

168-D. New Developments in Firing Combination Liquid and Gaseous Fuel. E. T. W. Bailey. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 226-230; disc., p. 230-233.

Discusses plant expansion which includes new coke ovens underfired with blast furnace gas. Diagrams. (D2)

169-D. Sulphur in Residual Fuel Oils. C. F. Kottcamp. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 233-241; disc., p. 241-244.

Chemical and mechanical difficulties of removing sulfur. Graphs, tables. (D2, B18)

170-D. Significance, Factors Affecting, and Methods of Measuring Preheated Air Temperature. Henry S. Hall. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 244-250; disc., p. 250-253.

General description of raising preheat temperature. Graphs. (D2)

171-D. Instrumentation at the Open Hearth, Crucible Steel Company. Lester W. Moore and Herman E. Meek. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 253-256.

Automatic pressure and fuel-air ratio control; and automatic reversal. Diagrams. (D2, S18)

172-D. Some Instrumentation Functions on the New Open Hearth Furnaces, Jones and Laughlin Steel Corporation. R. A. Lambert. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 257-265.

Roof-temperature control and automatic reversal. Photographs. (D2)

173-D. Atomizing Oil With High-Pressure Natural Gas. L. D. Yager. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 266-267.

Effect on refractories and furnace efficiency. (D2, B18)

174-D. Designing a Furnace to Use Natural Gas. H. C. Barnes. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 267-280.

Method of studying flow lines by the use of small-scale cold models using air carrying a paint spray fog to determine the flow lines. Diagrams. (D2)

175-D. Effect of Uptake Dimensions on Furnace Performance, Inland Steel Co. L. R. Berner. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 281-283.

Experience with basic ends, multiple burners, and restricted uptakes. Graphs. (D2)

176-D. Effect of Uptake Dimensions on Furnace Performance, Steel Company of Canada. J. E. Hood. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 283-285; disc., p. 285-286.

General discussion of furnace performance. (D2)

177-D. Effect of Liberian Ore on Open Hearth Production. R. P. Carpenter. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 307-308; disc., p. 308-309.

Characteristics and chemical reactions of ore. (D2, B22)

178-D. Use of Moroccan Ore at Fairfield Steel Works. C. C. Benton. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 310-311; disc., p. 311.

Physical characteristics and chemical analysis. (D2, B22)

179-D. Experience in Indefinite Banking at Inland. Josef S. Kapitan and Michael Slifko. *Blast Furnace and Steel Plant,* v. 41, May 1953, p. 497-502.

Fundamentals of the banking method used by the blast furnace department at Inland Steel Co. Discusses steps in chronological order. (D1)

180-D. Lone Star Steel Company Operations. W. R. Bond. *Blast Furnace and Steel Plant,* v. 41, May 1953, p. 508-513.

Types of iron ore used; beneficiation and sintering plants; coal and coke; ovens; and blast furnace. (D1, B general, Fe)

181-D. Results Obtained on Ensley Blast Furnaces Following Installation of High-Pressure Turboblowers. J. J. Shannon. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 5-23; disc., p. 23-24.

Furnaces, equipment, and results obtained. Graphs, tables. (D1)

182-D. Operating With Leone's Differential Pressure Control at Neville Island Blast Furnace. L. W. Adams, Jr. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 24-28; disc., p. 28-40.

Mechanics of the operation. Graphs. (D1)

183-D. Experience With Conditioned Blast at the Woodward Iron Company. H. A. Byrns. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 41-44; p. 45-49.

Investigation to determine what benefits might be attained by the use of conditioned air in the manufacture of merchant pig iron. Tables. (D1, Fe)

184-D. Multiple Correlation of Blast Furnace Variables. R. V. Flint. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 49-68; disc., p. 68-73.

Application of multiple correlation to blast-furnace problems. Shows that it is only one of many analysis methods and should be supplemented by other techniques wherever this will lead to a better overall solution. Tables. (D1, S12)

185-D. The Krupp-Renn Process, a Direct Process for Siliceous Iron Ores. Friedrich Johannsen. *Blast Furnace, Coke Ovens and Raw Materials Proceedings,* v. 11, 1952, p. 75-88; disc., p. 88-92.

The Renn process is particularly suitable for treating siliceous iron ores which could not be economically treated either in the blast furnace or by the usual dressing operations. Process has low handling costs and does not employ metallurgical lump coke. Graphs, photographs. (D8, Fe)

186-D. Operation of an Experimental Blast Furnace. Russell C. Buehl and Miles B. Royer. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 111-120; disc., p. 120-124.

Extensive pilot-plant tests involving the operation of a 3-ton per day blast furnace and a 600-lb. basic converter to recover Mn from openhearth slags. Diagrams, tables. (D1)

187-D. Distribution of Manganese Between Slag and Metal Under Reducing Conditions. J. E. Stukel and J. Cocubinsky. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 124-131; disc., p. 131-137.

Investigation to study the equilibrium distribution of Mn between blast-furnace-type slags and iron saturated with carbon. Graphs, tables. (D1, Fe)

188-D. Blast Furnace Burdening for Coke of Varying Qualities. Charles M. Squarcy. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings.* v. 11, 1952, p. 137-143; disc., p. 143-144.

Study to determine maximum amount of foreign coke that can be used compatible with uniformity of product. Graphs, tables. (D1)

189-D. Some Present Views of Refractories for Blast Furnace Linings. J. A. Pierce and Raymond E. Birch. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 145-152; disc., p. 152-157.

Progress report on trends in blast furnace refractories. Photographs. (D1)

190-D. Some Recent European Improvements in the Field of Coke Ovens, Blast Furnaces, Stoves, and Low-Temperature Distillation. Daniel Petit. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 202-211; disc., p. 211-213.

Free-expansion oven, Cowper stoves of varying turbulence, a new device for charging blast furnaces, and present situation of low-temperature distillation in Europe. Diagrams, photographs. (D1)

191-D. A Comparison of Blast Furnace Operations With and Without Coke Produced From Pennsylvania Low-Volatile Coals. W. C. M. Bennett. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 241-245; disc., p. 245-246.

Practical results, on a group of furnaces, of the use of coke whose quality was improved through application of blending method. (D1, B18)

192-D. Physical Conditions in the Combustion and Smelting Zones of a Blast Furnace. J. F. Elliott, R. A. Buchanan, and J. B. Wagstaff. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 246-262; disc., p. 262-266.

Investigation of the combustion region by using a high-speed camera with a maximum speed of 3000 frames per sec. Diagrams, graphs. 9 ref. (D1)

193-D. Ironmaking. Part V. Slag/Metal Reactions. John Taylor. *Iron and Steel,* v. 26. May 1953, p. 155-160.

Role of S, Si, Mn, and P in iron making. Reduction of iron oxide and effects of N_2, and C in iron. 67 ref. (D1, Fe)

194-D. Expansion at Shotton. New Developments at John Summers & Sons, Ltd. *Iron and Steel,* v. 26, May 1953, p. 175-182, 187.

Major units which were installed. Includes coal handling and blending plant; coke-ovens and by-product plant; blast furnace plant: blowing and power station; and new steel-melting shop. Photographs. (D general, B18, ST)

195-D. Induction Stirrers. Profitable Use for Electric Arc Furnaces. P. E. Hammarlund. *Iron and Steel,* v. 26, May 1953, p. 188-190.

Construction of the stirrer and its advantages. Diagrams. (D5, ST)

196-D. Atlantic Steel Using Cold Metal Charge Finds Costs in Favor of Electric Furnace. J. E. Wilbanks. *Journal of Metals,* v. 5, May 1953, p. 627.

Briefly compares openhearth and electric furnaces. (D2, D5, ST)

197-D. Metallic Oxidation in Chromium Steel Melting. D. C. Hilty, G. W. Healy, and Walter Crafts. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers. Transactions,* v. 197, 1953, p. 649-653.

By means of a theoretical extension of the Cr-C temperature relation in molten Cr steels and by a correlation of the ratios of Cr to Fe in the slag and metal, a method was developed for estimating amount of metallic oxidation during the oxidizing period of a Cr steel heat. Tables and graphs. (D general, AY)

198-D. Production of Commercial Blast Furnace Slag. Fred Hubbard. *American Concrete Institute, Journal,* v. 24, Apr. 1953, *ACI Proceedings,* v. 49, 1953, p. 713-719.

Types of blast furnace slag produced commercially; geographic availability; extent to which slag produced at blast furnaces is commercialized; usual chemical composition; and production procedures which differ from those of other aggregates. 15 ref. (D1, B21)

199-D. Electric Ore Smelting Passes Tests. H. S. Newhall. *Steel,* v. 132, May 11, 1953, p. 144, 147.

Experimental results and advantages of making steel from ore in a duplex electric furnace operation. Photographs. (D5, ST)

200-D. Operation Seraphim. Appleby-Frodingham's Campaign for More Iron. *Times Review of Industry,* v. 7, May 1953, p. 30.

Project to increase the output of pig iron. Construction of blast furnaces, blowing equipment, crushing plant, and sinter machines. (D1, B13, B16, CI)

201-D. Welded Blast-Furnace Skip Bridge. *Welding and Metal Fabrication,* v. 21, May 1953, p. 175-176.

Tubular structure used to solve space problem in building skip bridge. Photographs. (D1, K general, CN)

202-D. (German.) **Modern Design of a Blast Furnace.** Willi Dehne. *Stahl und Eisen,* v. 73, no. 4, Feb. 12, 1953, p. 222-224.

Walls consist of a Cu profile tube wound to inner and outer spirals. These can be water-cooled by flow in either direction. Head is built as an individual part and cooled separately. (D1)

203-D. (German.) **Operation of Low-Shaft Blast Furnace.** Heinz Schumacher. *Stahl und Eisen,* v. 73, no. 5, Feb. 26, 1953, p. 257-266.

Effect of O_2 enrichment and blast temperature on heat available in the furnace. Compares operation results when ferromanganese is produced both with and without addition of O_2. Diagrams. (D1, Fe, Mn)

204-D. (German.) **Problem of Mixer Life.** Alfred Latour and Josef Schoop. *Stahl und Eisen,* v. 73, no. 5, Feb. 26, 1953, p. 266-272.

Effects of heating up, slag composition, and control practice on the life of mixer linings. Photographs. (D2)

205-D. (German.) **Development of Blast Furnace Gas Cleaning During the Last Ten Years.** Kurt Guthmann. *Stahl und Eisen,* v. 73, no. 5, Feb. 26, 1953, p. 283-292.

Reviews practices in Germany, U. S. A. and England. Various phases of primary and final cleaning. Diagrams, tables. (D1)

206-D. (German.) **Behavior of Nitrogen in Basic Bessemer Steel Heats With Different Cooling Before Conversion.** Willy Oelsen and Hans Jürgen Därmann, *Stahl und Eisen,* v. 73, no. 6, Mar. 12, 1953, p. 338-346.

Reaction process with various N, Mn, and P contents. Relationship between dephosphorization during preblowing and N content. Graphs. (D3, ST)

207-D. (Italian.) **Ingot Mold Design and Ingot Quality.** F. Borelli. **Temperature and Solidification Rate and Ingot Quality.** G. Camolese. *Metallurgia Italiana,* v. 45, no. 2, Feb. 1953, p. 56-68.

Two reports and a discussion on their relationship. Graphs. (D9, Fe)

208-D. Heating-Up Open Hearth Furnaces After Rebuilding. Hobart M. Kraner and Charles N. Jewart. *Industrial Heating,* v. 20, Mar. 1953, p. 547-548, 550, 552, 554; May 1953, p. 959-960, 962, 964, 966, 968.

Part I outlines tests and actual shop trials used to develop fastest safe heating-up rate for silica-brick roofs. Part II covers heat-up assembly developed for the openhearth burner and presents results of a survey of heating-up times in the industry. (D2, F21)

209-D. Construction of Low-Shaft Blast Furnace Nears Completion. *Iron Age,* v. 171, May 21, 1953, p. 133-137.

Furnace built to utilize low-grade ore which will make 60 to 100 tons of iron per day. (D1, CI)

210-D. (German.) **Treatment of Raw Iron and Steel With Slag as an Agent for Improvement of Steel.** Eduard Senfter. *Archiv für das Eisenhüttenwesen,* v. 24, no. 1-2, Jan.-Feb. 1953, p. 1-10.

Tests on heating of blast furnaces and steel-plant slags showed that an S-poor, hot slag is obtained which can desilicize, desulfurize, and overheat the crude iron. Tables, diagrams, graphs. 3 ref. (D general, B21, CI)

211-D. (German.) **Vibration Methods for Manufacture of Converter Linings.** Alfred Latour and Josef Schoop. *Stahl und Eisen,* v. 73, no. 2, Jan. 15, 1953, p. 81-84.

Mechanical and chemical wear of converter bottoms and decreasing of pore volumes. Various vibrators and their operation. Test data with Sinex vibrators using 400, 800, and 2000 watts. Graphs, photographs. (D3)

212-D. (German.) **Operational Results With Fire-Clay Ladle Bricks of Different Types When Pouring Soft Open-Hearth Steel.** Karl-Otto Zimmer. *Stahl und Eisen,* v. 73, no. 7, Mar. 26, 1953, p. 411-415.

Production tests were made on 17 types of ladle bricks and the data compared with laboratory results. Graphs, tables. (D9, Fe)

213-D. (Book.) **American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,** (Annual Volume), v. 35, 1952. 342 p. National Open Hearth Committee, Iron and Steel Division, AIME, Room 905, 29 West 39th Street, New York 18, New York.

Individual papers, separately abstracted, covering acid and basic openhearth practice from high hot-metal charge to low-iron or cold-charge operations. (D2)

214-D. (Book.) **Blast Furnace, Coke Oven, and Raw Materials Proceedings, American Institute of Mining and Metallurgical Engineers, Iron and Steel Division.** (Annual Volume), v. 11, 272 p., 1952. AIME, 29 West 39th St., New York 18, N. Y.

Papers and discussions on important factors in the progress of the steel industry. Papers abstracted separately. (D1)

E

FOUNDRY

233-E. Plaster Casts for Pressure-Cast Matchplates. *Canadian Metals,* v. 16, May 1953, p. 28-30.

By using plaster as the mold material only one master pattern is required for any number of reproductions in the plate. High degree of accuracy is maintained and ultimate costs can be reduced. (E16, Al)

234-E. Foundry Characteristics of Aluminum and Magnesium. M. W. Martinson. *Canadian Metals,* v. 16, May 1953, p. 32-34.

Summary of the defects that may be encountered in making castings. (E general, Al, Mg)

235-E. The Cothias Process. E. N. Field. *Machinery,* (London), v. 82, Apr. 24, 1953, p. 779-781.

Method, applications, advantages, and disadvantages of a die-casting process. Diagrams. (E13)

236-E. Method of Registering, Clamping, Closing-Up and Supporting Shell Moulds. A. S. Beech. *Machinery* (London), v. 82, Apr. 24, 1953, p. 784-786.

Method and advantages. Photographs. (E16)

237-E. Quality in Light Metal Castings. *Metal Industry,* v. 82, May 1, 1953, p. 359-360.

Benefits derived from standardization. (E general, S22, Al, Mg)

238-E. Die Castings in Trico-Folberth Products. *Metal Industry,* v. 82, May 1, 1953, p. 361-364.

Ways in which pressure die casting has influenced design, simplified assembly, and eliminated operations. Examples are given of automobile accessories using Al and Zn alloys. Photographs. (E13, T21, Al, Zn)

239-E. (French.) **Improvements From Synthetic Resin-Based Agglomerants.** G. L. Harbach and P. G. Pentz. *Fonderie,* no. 86, Mar. 1953, p. 3331-3343.

Use of rejuvinated sand mixtures. Tables, photographs, graphs, diagrams. 5 ref. (E18)

240-E. (French.) **Study of a Light Alloy Casting Subjected to Static and Dynamic Tests.** Louis Grand. *Fonderie,* no. 86, Mar. 1953, p. 3344-3350.

The casting of tubes in sand and improvement of fatigue resistance and machanical characteristics of cast pieces. Photographs, tables, diagrams. (E11, Q general, Al)

241-E. (French.) **Characteristics of Aluminum Alloys Rich in Magnesium.** *Fonderie,* no. 86, Mar. 1953, p. 3357-3360.

Discusses the alloys A-G3T-Y, A-C6-Y, 2A-5GL-Y, and especially A-G4Z. Tables. (E25, Q general, Al, Mg)

242-E. Dry Reclamation of Molding Sand Lowers Cost of Steel Castings. James A. Cannon. *American Foundryman,* v. 23, May 1953, p. 68-73.

Advantages of using reclaimed sand for facing mixes. Study of casting defects and quality indicates reclaimed sand is comparable to new sand. Diagrams, graphs. (E18, CI)

243-E. Research in Pattern Coating Produces Quality Castings. Charles J. Berg. *American Foundryman,* v. 23, May 1953, p. 80-86.

Types of coatings commonly used. Data comparing the package, application, and dry film characteristics of shellac, crankcase sealer and seven other pattern coatings. Shortcomings and virtues of different coatings. Cost factors and the inherent economies of higher solids coatings. Application techniques and shop conditions. Several suggestions concerning these problems. Photographs. (E17)

244-E. Hot Boxes Bake Cores Without Use of Driers. W. M. Peterson. *American Foundryman,* v. 23, May 1953, p. 87-89.

Development of system for making and baking cores in one operation. Photographs. (E21)

245-E. Melting Iron in the Reverberatory Furnace. J. G. Winger and H. E. Simmons. *American Foundryman,* v. 23, May 1953, p. 94-99.

Aspects of the furnace with respect to fuel, maintenance, refractories, melting, and advantages. Graphs, photographs, tables. (E10, CI)

246-E. An Automatic Apparatus for Recording Evolution of Gas From Foundry Cores. G. V. Cullen. *Australian Journal of Applied Science,* v. 4, Mar. 1953, p. 58-64.

Apparatus which records rate at which gas is evolved when a foundry sand core is heated at constant pressure in an inert atmosphere. Photographs, diagrams. (E21)

247-E. Economies in the Use of Moulding Materials. W. B. Parkes. *British Cast Iron Research Association Journal of Research and Development,* v. 4, Apr. 1953, p. 525-530; disc., p. 530-533.

Methods for avoiding waste of molding materials. (E19)

248-E. Developments in Steel Castings in the Heavy Power Plant Industry. F. Buckley. *Foundry Trade Journal,* v. 94, Apr. 9, 1953, p. 405-411; Apr. 16, 1953, p. 439-444.

Developments in the science of foundry production and practice. Steel casting problems encountered in the manufacture of heavy prime-movers and power generators. Trends in application of castings within the heavy engineering industry. Photographs. (E11, T25, CI)

249-E. Interchangeable Cores in Die-Casting. H. K. Barton. *Metal Industry,* v. 82, Apr. 24, 1953, p. 321-322.

Shows that the use of interchangeable cores is a valuable expedient in many types of die casting. Diagrams. (E13)

250-E. Propeller Blade Blemishes. *Metal Industry,* v. 82, Apr. 24, 1953, p. 330.

Shows that surface defects which appear during polishing, and often give considerable trouble, have their origin much earlier in the history of the casting. Photographs. (E25, Cu)

251-E. Castings for Measuring Instruments. *Metallurgia,* v. 47, Apr. 1953, p. 206-208.

Metal melting; sand plant and molding equipment; and core shop of foundry for instrument manufacture. Photographs. (E11, T8, Cu, Al)

252-E. (French.) **Influence of Boron on the Properties of Black-Heart Malleable Cast Iron.** Georges Martin. *Fonderie,* no. 84, Jan. 1953, p. 3265-3280.

Influence of B in the absence of Cr for determining the action on graphitization annealing and mechanical properties. Tables, micrographs. (E25, Q general, B, CI)

253-E. (French.) **Relationship Between Drying Time and Thickness of a Core.** Maurice DeCrop. *Fonderie,* no. 84, Jan. 1953, p. 3281-3285.

Experimental data on a series of cores of increasing thickness. Presents a curve demonstrating baking time as a function of thickness. Graphs. (E21)

254-E. (French.) **Mechanism of Stripping.** Gabriel Chauvin. *Fonderie,* no. 85, Feb. 1953, p. 3295-3306.

Compares techniques used in French foundries with practices used in other countries. (E24)

255-E. (French.) **Cracks or Fissures in Stove Castings.** Pierre Nicolas. *Fonderie,* no. 85, Feb. 1953, p. 3313-3316.

Origin of fissures and ways of avoiding them in sand or earthen molds. Micrographs. (E25)

256-E. (French.) **Self-Cleaning Twin Tuyeres.** *Fonderie,* no. 85, Feb. 1953, p. 3317-3321.

Operating principle, installation, utilization, and different types. Diagrams. (E10)

257-E. (German.) **Bouard's Equilibrium in the Cupola and the Influence of Stack Height.** Wolfgang Von Preen. *Giesserei,* v. 40, no. 6, Mar. 19, 1953, p. 141-144.

Bouard's equilibrium fixes the laws of formation of furnace gas by disregarding air dampness. Temperature at which reaction stops is used as reaction temperature in the equilibrium state. (E10)

258-E. (German.) **Prerequisites for Production of Spherical Graphite Cast Iron, Its Properties and Uses.** Karl Löhberg. *Stahl und Eisen,* v. 73, no. 4, Feb. 12, 1953, p. 212-218.

Addition of Mg to the melt and its relationship to the S content. (E25, CI)

259-E. (German.) **Industrial and Economic Basis of Nonferrous, Heavy Metal, Compound Casting.** G. Schwietzke. *Zeitschrift für Metallkunde,* v. 44, no. 1, Jan. 1953, p. 8-17.

Process for preparing compound castings of Cu alloys and steel. Diagrams. (E16, Cu, CI)

260-E. Fuel and Metal. R. J. Sarjant. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. A24-A33.

Part played by fuel in practical and scientific foundry practice. Graphs, diagrams. 33 ref. (E general, B18)

261-E. Flow of Metal. E. M. Curie, chairman. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. A48-A55; disc., p. A55-A56.

Serves as a narrative to accompany a film showing flow patterns of metals entering molds. Photographs. (E25)

262-E. Probable Trends in British Steelfoundry Practice. F. Cousans. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. A110-A113; disc., p. A121-A125.

Considers steelmaking, melting, sand practice, molding, coremaking, "C" process, cleaning, materials handling, production control, training programs, and foundry methods. (E general, CI)

263-E. Gas Removal From Molten Aluminium Alloys. A. W. Brace. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. A138-A146; disc., p. A146-A148.

Survey of gas absorption and removal, including sources of H_2, mechanism of absorption, factors affecting the amount of porosity and its distribution, and conditions for the removal of gas from the melt. Consideration is given to the application of this knowledge for the production of castings under normal foundry conditions. Effects of Cl and volatile chlorides on the soundness of castings. Micrographs, graphs. (E25, Al)

264-E. Grain Refinement of Non-Ferrous Castings. G. Swinyard. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. A149-A154; disc., p. A154-A156.

Grain refinement of Al, Mg, and Cu alloys. Micrographs, diagrams. 19 ref. (E25, Al, Mg, Cu)

265-E. Research on Atmospheric Dust in Steel Foundries With Special Reference to the Use of Statistical Surveys. G. M. Michie and G. H. Jowett. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. A190-A200; disc., p. A200-A204.

Use and interpretation of atmospheric dust surveys. Reference is made to dust sampling and estimation, and to potential importance of automatic methods. Data from two environmental dust surveys in steel foundries are discussed. Statistical considerations involved in design and analysis of such surveys are considered. Tables, graphs. (E general, A5, A7)

266-E. Experiences With the Investment Casting Process. D. F. B. Tedds. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B1-B14.

Possibilities and limitations of the process. Gives examples of special components for which it has been adapted on an experimental basis. Various features of investment casting are analyzed and the present position and future development are treated. Diagrams, tables, photographs. (E15)

267-E. Cross-Section of a Non-Ferrous Jobbing Foundry. J. Gorman. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B15-B28.

Pump castings, semirepetition, and architectural casting. Photographs. (E general, EG-a)

268-E. Castings to Resist Abrasive Wear. E. J. Brown. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B29-B37.

How Mn-steel as well as alloy cast irons and other alloy steels were developed to meet service conditions. Gives manufacturing methods and applications for these materials. Flame hardening, nitriding, and surface deposits of abrasion resisting material are considered. Photographs, micrographs, diagrams, graphs. (E general, J2, J28, Q9, AY, CI)

269-E. Process Planning in the Steel Foundry. S. L. Finch. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B38-B47.

Means to achieve high-quality, greater productivity from men and materials, and to do this repetitively on an economic basis. Photographs, diagrams. (E general, A6, ST)

270-E. Recent Development of Cupola Design With Special Reference to Hot-Blast. Fritz Schulte. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B48-B58; disc., p. B59-B62.

Considers similarity to blast furnace, performance figures, lining profile, heat lost to cooling water, thin linings, preheated air, limiting factors, types of recuperators, modified cupola design, melting with O_2 addition, and induction heating addition. Graphs, diagrams. (E10)

271-E. Castings for the Corliss Steam Engine. D. Redfern. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B63-B73.

Casting half flywheels, trunk guide soleplates, and steam cylinders. Extensive photographs. (E general, CI)

272-E. Chemical Chilling and Feeding. J. E. R. Tompkin. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B74-B76; disc., p. B76-B77.

Compares orthodox chilling, Te chilling, feeding, and exothermic feeding. Diagrams. (E23, E25)

273-E. Castings for a Small Diesel Engine. H. J. M. Conacher. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B78-B86.

How a company producing whiteheart malleable castings undertook production of high-duty gray-iron castings for a small diesel engine. Photographs. (E general, T25, CI)

274-E. Production of Castings in Aluminium-Bronze, D.T.D. 412. L. Hargreaves. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B108-B110.

Melting, pouring, casting, feeding, and chills. Photographs. (E11, Al, Cu)

275-E. Foundries in the French Ardennes. A. R. Parkes. *Institute of British Foundrymen. Proceedings,* v. 45, 1952, p. B111-B120; disc., p. B120-B124.

Five French foundries as observed by a British team. Photographs. (E general)

276-E. Production Aids in the Steel Foundry. G. D. McNair. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B134-B137.

Improved casting technique which was found to increase production. Diagrams. (E general, CI)

277-E. Ways and Means to Increased Productivity. John Hunter. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B138-B143.

General factors affecting productivity in the foundry. Lists and examines in detail major influences and means for improvement. Patterns, molding, boxes, manual effort, roller-track, overhead hoppers, "Sandslingers", and rubbish disposal are dealt with. Diagrams. (E general, A8)

278-E. (Book.) **Cast Bronze.** Harold J. Roast. 458 p. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $4.00.

Describes a theoretical bronze foundry; foundry layout; purchase and handling of metal; fuels and furnaces, melting and sand; making castings, cores, and dry sand molds; inner life and activity of metals; chemical and physical testing; and various types of bronzes. (E general, Cu)

279-E. (Book.) **Institute of British Foundrymen, Proceedings, (Annual Volume),** v. 45, 377 p. 1952. Institute of British Foundrymen, Saint John St. Chambers, Deansgate, Manchester 3, England.

Contains 33 papers which have been abstracted separately. (E general)

280-E. (Book—German.) **(Molding and Pouring.) Das Formen und Giessen.** Adolf Fischer. 178 pages. 1951. B. G. Teubner Verlagsgesellschaft, Leipzig, Germany.

Various molding and casting processes. Practical applications in brief and concise form. (E19, E23)

F

PRIMARY MECHANICAL WORKING

131-F. Large Forging-Presses. G. W. Richards. *Aircraft Production,* v. 15, May 1953, p. 154-161.

Specific pressures, dimensional tolerances, distortion, preparation of forging stock, die blocks, and design analysis. Diagrams and photographs. (F22)

132-F. Strip Mill Does a Quick Change. *Steel,* v. 132, May 18, 1953, p. 100, 102.

Replacement of a continuous mill with another of larger size in 15 days. (F23)

133-F. (German.) **Some Investigation on Wire Pulling.** F. C. Thompson. *Berg- und Hüttenmännische Monatshefte,* v. 98, no. 2, Feb. 1953, p. 21-31.

Determinations of tractive force and groove angle of traction were made through reasonable ranges. Metallic flow, friction, mechanical properties of the product and internal stress were examined. Data were mathematically analyzed. Photographs, graphs, diagrams, tables. 18 ref. (F28, Q general, Ni, Cu, Al, ST)

134-F. Cold Working of Metals. Joseph Geschelin. *Automotive Industries,* v. 108, Apr. 15, 1953, p. 32-35, 130.

Various production processes for reducing waste and improving quality. Photographs. (F general, G general, CN, Cu)

135-F. Rolls and Their Maintenance in the Non-Ferrous Metals Industry. *Institute of Metals, Journal,* v. 81, 1953, *Institute of Metals, Bulletin,* v. 1, May 1953, p. 199-202.

Roll usage, manufacture, servicing, and maintenance. Rolling of Cu, Zn, Ni, and Ni alloys. (F23, Cu, Zn, Ni)

136-F. Selecting Forging Alloys. Lester Spencer, *Product Engineering,* v. 24, May 1953, p. 202-207.

Characteristics of carbon steels, medium-alloy steels, high-alloy materials, high-temperature alloys, and nonferrous materials. Defines heat treatments commonly used on forgings. Tables. (F22, J general, CN, AY, SG-h, EG-a)

137-F. (German.) **Reasons for Surface Defects in Hot Working Plain Carbon Steel.** Herbert Buchholtz and Richard Pusch. *Stahl und Eisen,* v. 73, no. 4, Feb. 12, 1953, p. 204-212.

Describes scaling tests in different furnace atmospheres using specimens taken from pickled rounds representing heats from several steel plants. (F21, CN)

138-F. (German.) **Economic Significance of a Full-Continuous Mill Train for Rolling Semifinished Steel Products.** Helmut Weiss. *Stahl und Eisen,* v. 73, no. 5, Feb. 26, 1953, p. 272-279.

Compares rolling schedules, yields, output, and costs of rolling with 3-stand, 3-high mill train. Graphs, tables. (F23, ST)

139-F. Soaking-Pit Instrumentation. F. R. Pullen. *Instruments,* v. 26, May 1953, p. 724-726, 752, 754.

Important considerations in pit-furnace instrumentation such as fuel, pit-temperature, combustion, and pit-pressure control. Diagrams, photographs. (F21)

140-F. Forging World's Largest Air Compressor Discs Involves Special Problems. *Industrial Heating,* v. 20, May 1953, p. 854-856, 858, 860.

Forging 50-ton rotor disks. Photographs. (F22)

141-F. Costing and Estimating. Application in the Drop-Forging Industry. A. Taylor. *Metal Treatment and Drop Forging,* v. 20, May 1953, p. 223-227.

Importance of determining actual and probable costs. (F22, A6)

142-F. Steels for Cold Extrusion. Behaviour During Processing and Resultant Properties. D. V. Wilson. *Metal Treatment and Drop Forging,* v. 20, May 1953, p. 229-235, 242.

Includes steels from 0.1 to 0.4% C. Considers influence of microstructure, surface quality requirements, rate of straining, strain-aging, deformation, and stress relieving. Micrographs, graphs. (F24, Q general, CN)

143-F. Rolling Tapered Aluminum Isn't Easy. John H. Allen. *Steel,* v. 132, May 25, 1953, p. 118-119.

Shows that aircraft builders' needs are stimulating development of the art and production capacity. Discusses methods. (F23, Al)

144-F. (German.) **Design and Operation of Full-Continuous Mill Trains for Medium Strip and Their Relation to Wide Strip Rolling Mills.** Karl Wallmann. *Stahl und Eisen,* v. 73, no. 7, Mar. 26, 1953, p. 394-401.

Requirements demanded by processing industry on modern medium strip. Constructional features of medium strip as differing from wide strip mills. Tables, graphs. (F23)

145-F. (Book—German.) **(Steel Wire) Stahldraht.** A. Pomp. 335 p. Verlag Stahleisen, Düsseldorf, Germany. $9.50.

Starts with the wire rod, as it comes from the mill, and discusses effects of imperfections in the rod upon the quality of the finished wire. Describes and illustrates all stages of wiremaking and testing. Descriptions of pickling, hardening, straightening, polishing, and coating operations. (F28, ST)

G

SECONDARY MECHANICAL WORKING

175-G. Stretch-Forming. Part III. Tooling Methods. Die Materials. The Construction and Use of Matched Tools. Support-Snakes. Heat-Treatment. (Concluded). *Aircraft Production*, v. 15, May 1953, p. 169-171.

Construction methods for various types of forming dies. Die materials and the use of auxiliary equipment such as formed pressure-bars and snakes. Typical examples are illustrated. Diagrams. (G9, Al)

176-G. Relative Abrasiveness of the Cast Surfaces of Various Gray-Iron Castings on Single-Point Tools of High-Speed Steel. Joseph Datsko and O. W. Boston. *ASME, Transactions*, v. 75, Jan. 1933, p. 103-107; disc., p. 107-108.

Means for eliminating abrasive surfaces consisting of combined annealing and pickling treatments. Micrographs and graphs. (G17, J23, L12, CI)

177-G. Electrolytic Grinding or Machining of Metals. O. W. Storey. *Electrochemical Society, Journal*, v. 100, May 1953, p. 125C-126C.

Electrolytic grinding method which utilizes a fast-moving cathode having spaced-apart insulating particles imbedded in its surface and protruding evenly above it for spacing the cathode from the work. (G18)

178-G. How to Increase the Life of Cutting Dies. Federico Strasser. *Iron Age*, v. 171, May 14, 1953, p. 144-146.

Factors which influence die life. (G1)

179-G. Deep Drawing Steel Sheet Surface Quality. R. J. Walter. *Journal of Metals*, v. 5, May 1953, p. 630.

Describes defects which are likely to occur during production and emphasizes importance of inspection. (G4, S13, CN)

180-G. Cost-Cutting Dies. Peter S. Tobias and Carl Erickson. *Machinery* (American), v. 59, May 1953, p. 155-162.

Describes a few of the most outstanding dies employed for producing control instrument parts. Diagrams, photographs. (G1)

181-G. Bending Hollow Rectangular Tubing at Raytheon. Harry F. Clarke. *Machinery* (American), v. 59, May 1953, p. 170-174.

Methods employed in bending and twisting hollow rectangular tubing with smooth, regular, and continuous inside surfaces. Photographs. (G6)

182-G. Application of Stellite to Machining. *Machinery Lloyd* (Overseas Ed.), v. 25, Apr. 25, 1953, p. 91-92.

Types of cutting metals, shaping the alloy, and cutting speeds. (G17, SG-j)

183-G. Mounting Keeps Vibration in Its Place. William C. Gallmeyer. *Steel*, v. 132, May 18, 1953, p. 90-91.

Vibration-reducing mountings on a grinder motor keep vibrations from reaching the grinding wheel. Diagrams. (G18)

184-G. (French.) **The Oxygen Lance as a Fabrication Device.** C. G. Keel. *Revue Soudure*, v. 8, no. 4, 1952, p. 158-174.

Application to machine construction, metallic framework fabrication, engines, and apparatus. Photographs, graphs, diagrams. 10 ref. (G22)

185-G. (German.) **Analysis of Machining Experiments of Special Alloys.** Wilhelm Späth Lustadt. *Metalloberfläche*, v. 7, ser. A, no. 1, Jan. 1953, p. A6-A8.

Analysis is made from standpoint of theoretical observations, test results, and abrasion criteria for carbide tools. Graphs. 6 ref. (G17, C-n)

186-G. (German.) **Machining Problems.** W. Späth. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 19, no. 2 1953, p. 39-44.

Analysis of machining tests, influence of gaseous cooling agents, workability, and microstructure of cast iron. (G17, CI)

187-G. Rubber-Forming Kink Cuts Wrinkles at Convair. Robert B. Stanton. *American Machinist*, v. 97, May 25, 1953, p. 132.

Use of steel master parts with rubber pressure pad for producing wrinkle-free Al parts. (G8, Al, ST)

188-G. Requirements of Machine-Shop Inspection. C. Walker and F. H. Greenwood. *Institute of British Foundrymen, Proceedings*, v. 45, 1952, p. B125-B131; disc., p. B131-B133.

Machinists' viewpoint for quality of castings including design, jigging, accuracy, machinability, and inspection. Inspection methods used by Vauxhall Motors' works. Photographs. (G17, S general, CI)

189-G. Large Gears Produced Faster, Cheaper, and More Accurately. F. P. Hennessy. *Iron Age*, v. 171, May 21, 1953, p. 140-143.

New technique which eliminates dual tooling. Photographs. (G17)

190-G. Fabricating of Metal Partitions at Steel Partitions, Inc. Walter Rudolph. *Modern Industrial Press*, v. 15, May 1953, p. 13, 16, 18, 22.

Illustrates press equipment. (G1, ST)

191-G. Producing Side Rails for Motor Vehicle Chassis Frames. *Modern Industrial Press*, v. 15, May 1953, p. 56-57.

New press for forming side rails. (G1, CN)

192-G. Fabricating & Finishing Aluminum Cartridge Tanks. *Modern Metals*, v. 9, May 1953, p. 60-62, 64.

Formation of the Aluminum Goods Manufacturing Co. Discusses anodizing and airless spray painting of Al cartridge tanks. Photographs. (G general, L19, L23, Al)

193-G. Tapping Titanium. V. Jamilkowski. *Modern Metals*, v. 9, May 1953, p. 66-67.

Machining characteristics, thermal qualities, retapping, correct tap design, and suitable lubricant. (G17, G21, Ti)

194-G. (French and German.) **Deep Drawing of Aluminum and Aluminum Alloys.** George Sachs. *Aluminium Suisse*, v. 3, no. 2, Mar. 1953, p. 38-48.

Pure Al and its heat treated alloys in relation to deep drawing of round containers and box-shaped parts in one operation, drawing of deeper parts with and without weakening of sheet, hot drawing of alloys, and drawing with rubber cushion. Photographs, graphs, diagrams. (G4, Al)

195-G. (French and German.) **Automatic Progressive Drawing in Working of Light Metals.** *Aluminium Suisse*, v. 3, no. 2, Mar. 1953, p. 55-56.

Automatic press that carries out several stampings as a continuous process. Intermediate heatings increased deformability. (G4, Al)

196-G. (German.) **New Researches Into the Deep-Drawing of Light Metals.** *Aluminium Suisse*, v. 3, no. 2, Mar. 1953, p. 49-51.

Test results on rounding off, friction forces, lubricants, and other factors. (G4, Al)

197-G. (German.) **Modern Facts on Formation of Ears During Deep-Drawing of Pure Aluminum and on Possibilities of Its Suppression.** H. A. J. Stelljes. *Metall*, v. 7, no. 5-6, Mar. 1953, p. 155-161.

Classifies and describes ears in relation to crystalline orientation by means of X-ray diagrams. Appropriate types of annealing furnaces. Photographs, graphs. 5 ref. (G4, J23, Al)

198-G. (German.) **Effect of Cold-Forming on Aging and Superstructure.** A. Kussmann. *Metall*, v. 7, no. 5-6, Mar. 1953, p. 182-186.

Extent to which property changes may be attributed to local temperature rises that accompany hardening. Testing of disturbance of atomic arrangement during plastic stressing. 22 ref. (G general, N7)

199-G. (Russian.) **High-Speed Oxygen Cutting.** A. N. Shashkov and S. G. Guzov. *Avtogennoe Delo*, v. 23, no. 9, Sept. 1952, p. 1-4.

Theoretical investigation. Comparison is made between ordinary and high-speed cutting with respect to expediency, time, and economy. Describes newly developed torch. Tables, photographs, graphs. (G21)

200-G. (Russian.) **Machine Cutting Stamped Heads.** L. I. Blagodatskii. *Avtogennoe Delo*, v. 23, no. 9, Sept. 1952, p. 25.

Automatic flame-cutting equipment for parts which do not require further machining. Used for boiler parts and heads. (G22)

201-G. (Book—German.) **(Upsetting and Pressing.) Stauchen und Pressen.** J. Billigmann. 574 pages. 1953. Carl Hanser Verlag, München, Germany. 28.50 Dm.

Mass production of small and medium-sized metallic objects without machining. Numerical data, tables. (G general)

H

POWDER METALLURGY

38-H. Factors Controlling the Combustion of Zirconium Powders. Holger C. Andersen and Lawrence H. Belz. *Electrochemical Society, Journal*, v. 100, May 1953, p. 240-249.

Activity of Zr metal powders was studied by measurements of ignition temperature, burning time, and ignition energy on subsieve powders prepared by Ca reduction of ZrO_2 and on coarse powders made by grinding fused Zr. Tables and graphs. 30 ref. (H11, Zr)

39-H. The Hard Carbides. Their Properties and Application to the Production of Sintered Hard Metal. A. G. Gardner. *Metallurgia*, v. 47, Apr. 1953, p. 163-170.

Manufacturing processes and control necessary to insure a consistently satisfactory product. Cemented

carbides used for cutting tools. Graphs, micrographs. (H general, C-n, SG-j)

40-H. Sorption of Gases at Very Low Pressures by Thorium Powder. S. Wagener. *Physical Society, Proceedings,* v. 66, sec. B, May 1953, p. 400-413.

Sorption rate of Th powder for O_2 and H_2 is measured at pressures between 10^{-7} and 10^{-3}mm Hg as a function of temperature of the Th and of the period of exposure to gas. Graphs. (H11, Th)

41-H. (French.) **Heat Resistant Materials. Progress in Fabrication of Tungsten and Molybdenum.** R. Locquin. *Métaux Corrosion—Industries,* v. 28, no. 329, Jan. 1953, p. 12-18.

Use of pure W and Mo, in massive form and as powder, because of their excellent qualities which depend on both chemical purity and suitable structure. (H general, T general, W, Mo)

42-H. (German.) **Use of Sulfur-Impregnated Sintered Powdered Iron as a Bearing Material.** Gerd Maassen. *Stahl und Eisen,* v. 73, no. 4, Feb. 12, 1953, p. 219-222.

Wearing effect upon steel. Compares sliding properties with those of other grades of powdered iron. (H11, T7, Q9, Fe)

43-H. (German.) **New Method for Reducing Fe Powders.** Heinrich Siepmann. *Stahl und Eisen,* v. 73, no. 6, Mar. 12, 1953, p. 360-364.

Turbulence reduction method. Plant design, operation, and test results. (H10, Fe)

44-H. (German.) **Synthetic Solids. XI. The Effect of Surface Layers, Especially Oxide Layers, on the Sintering of Metals.** M. Clasing and F. Sauerwald. *Zeitschrift für Anorganische und Allgemeine Chemie,* v. 271, no. 1-2, Dec. 1952, p. 88-92.

Thin oxide layers on Cu and Fe powders facilitated sintering if the upper layers of the particles were loosened and made more subject to reacting. (H15, Cu, Fe)

45-H. (German.) **Sintering and the Activity of Solids.** J. A. Hedvall. *Berichte der Deutschen Keramischen Gesellschaft e. V.,* v. 30, no. 1, Jan. 1953, p. 8-13.

Sintering without melting, recrystallization process, surface change, lattice structure, diffusion, and activity state. (H14, H15)

J

HEAT TREATMENT

107-J. Good Handling Speeds Heat Treating of Small Parts. Herbert Chase. *Iron Age,* v. 171, May 14, 1953, p. 141-143.

Use of belt-conveyors and a novel feeding device for eliminating guesswork and manual labor from heat treating small cold-headed parts. Photographs. (J general)

108-J. (French.) **Devices for Automatically Counterbalancing Furnace Doors.** M. Barbas. *Flamme et Thermique,* v. 6, No. 54, Mar. 1933, p. 13-20.

Fifty years of progress as shown by performance of modern furnaces. Photographs, diagrams, tables. 1 ref. (J general)

109-J. Close Control of All Variables in Heat Treating Landing Gear Struts. Merle W. McLaughlin. *Automotive Industries,* v. 108, May 15, 1953, p. 53, 114, 116.

Facilities and setup for heat treating SAE 4140, 4130 or 4340 steel parts. (J general, AY)

110-J. The Formation of Intracrystalline Voids in Solution-Treated Magnesium-Aluminium Alloys. E. Lardner. *Institute of Metals, Journal,* v. 81, May 1953, p. 439-442.

In a sample of an alloy that forms cavities, the cavity formation increases to a maximum and then eventually vanishes with increasing homogenization. Cavities are probably produced on cooling after solution treatment rather than during the progress of the heat treatment. (J27, Mg, Al)

111-J. (French.) **Burning of Light Alloy Castings During Hardening.** Henry Garnier. *Fonderie,* no. 85, Feb. 1953, p. 3307-3312.

Detection, mechanism of deterioration, and possible methods of control. Tables, micrographs, photographs. (J26, Al, Mg)

112-J. (German.) **The Annealing of Colors on Powders, Stability of Annealed Layers on Copper and Iron, and Solubility of Oxygen in Copper at Higher Temperatures.** M. Clasing and F. Sauerwald. *Zeitschrift für Anorganische und Allgemeine Chemie,* v. 271, no. 1-2, Dec. 1952, p. 81-87.

A study was made of the stability of oxide films formed during annealing. New data are presented for the solubility of O_2 in Cu. 11 ref. (J23, H12, Cu, Fe)

113-J. Why Uniform Heat Treatment is Essential in Artificially Aging Aluminum Alloys. C. W. Alesch. *Industrial Gas,* v. 31, May 1953, p. 3-5, 24-25.

Precipitation hardening of Al alloys sensitive to time-temperature conditions. Shows that precise controls are most important. Photographs. (J27, Al)

114-J. Heat Treatment of Stainless Steels. Lester F. Spencer. *Industrial Heating,* v. 20, Jan. 1953, p. 42, 44, 46, 48, 50; Feb. 1953, p. 220-222, 224; Apr. 1953, p. 678, 680, 682, 684, 686, 688, 690; May 1953, p. 879-880, 882, 884.

Part I discusses and tabulates information for Ni or austenitic grades of stainless steels, hardenable or martensitic grades, and nonhardening or ferritic group. Part II considers types of furnaces and practices recommended for heat treating stainless steels. Part III outlines heat treating cycles for three basic types of stainless steels. Part IV discusses nitriding stainless steels by the "Malcomizing" treatment and pickling and passivation after heat treatment. (J general, L12, R10, Ni, SS)

115-J. A Survey of Industrial Carbonitriding Practice. M. B. Bever, C. F. Floe, and W. G. Zaruba. *Industrial Heating,* v. 20, Feb. 1953, p. 256, 258, 260, 262, 264; Apr. 1953, p. 650, 652, 654, 656, 658, 660; May 1953, p. 872, 874, 994.

Part I outlines general applications of the carbonitriding practice as determined by a survey of 15 industrial installations. Part II describes furnaces, atmospheres, and cycles used in industrial carbonitriding. Part III covers properties, inspection, and service performance. (J28)

116-J. Stress-Relieving of World's Largest Air Compressor Discs. L. E. Anderson and J. F. McCarthy. *Industrial Heating,* v. 20, May 1953, p. 862, 864, 866, 868, 870, 1000.

Furnace for stress-relieving huge rotor disks. Photographs. (J1)

117-J. Precise Heat Treatment of Jarvis High-Speed Taps. *Industrial Heating,* v. 20, May 1953, p. 892, 894.

Equipment for heat treating W, Mo, and Co high speed steel ground thread taps. (J general, TS)

118-J. Automatic Furnace Heat Treats High-Strength Torsion Bars. Russell Graham. *Iron Age,* v. 171, May 21, 1953, p. 129-132.

Furnaces and equipment. Illustrated. (J general)

119-J. Properties and Manufacture of Valve Steels for the Automotive Industry. (Concluded). J. Cameron. *Metal Treatment and Drop Forging,* v. 20, May 1953, p. 213-218.

Effect of heat treatment on a number of steels. Data were collected from experimental work. (J general, T21, ST)

120-J. Instrumentation Simplifies Annealing. Hugh C. McKinnon. *Steel,* v. 132, May 25, 1953, p. 128, 130.

Shows that precise control of fuel mix and temperature in a 4-zone sheet and plate furnace promotes uniformity in the various physical values. (J23, SS, TS)

K

JOINING

294-K. Metallographic Examination of Ceramic-Metal Seals. A. G. Pincus. *American Ceramic Society, Journal,* v. 36, May 1953, p. 152-158.

Making of taper sections of ceramic-to-metal seals. Applications to research in adherence mechanisms and production trouble shooting. (K11)

295-K. Operating Experiences With Mechanical Joints in High-Pressure High-Temperature Steam Piping. E. C. Bailey, H. C. Schroeder, and I. H. Carlson. *ASME, Transactions,* v. 75, Jan. 1953, p. 97-101.

Results of investigation to determine suitability of several mechanical joints for joining 2¼% Cr, 1% Mo alloy steel to Type 347 stainless steel. Tests were made on pressure-seal and bellows-type joints. (K13, AY, SS)

296-K. The Right Rivet for the Right Job Can Save You Time and Money. Robert M. Gordon. *Machine and Tool Blue Book,* v. 49, Apr. 1953, p. 162-166, 168, 170-171; May 1953, p. 218-220, 222, 224, 226-232.

Types of rivets, riveting machines, tools used in riveting operations, and specific applications of various types of rivets. Photographs. (K13)

297-K. Welding the Stainless Steels. Helmut Thielsch. *Materials and Methods,* v. 37, May 1953, p. 115-130.

Electrodes for stainless steels; welding austenitic, martensitic, and ferritic grades; and procedures, joint designs, and preparation. Tables and photographs. (K general, SS)

298-K. The Research Approach to Welding. W. A. Martin. *Ontario Hydro Research News,* v. 5, Jan.-Mar., 1953, p. 1-3, 6.

A general study of some factors involved in welding. (K9)

299-K. Improvised Welder Meets a Crisis. Richard Avery. *Steel,* v. 132, May 18, 1953, p. 112-113.

Conversion of a semi-automatic into an automatic welder for fabricating steel tanks. Photographs. (K1, ST)

300-K. (French.) **Consideration in the Study of Fluxes.** G. M. Blanc and B. H. Deglon. *Revue Soudure,* v. 8, no. 4, 1952, p. 233-238.

A general discussion as applied to welding and brazing. Suggests a plan based on present literature. Extensive bibliography. (K general)

301-K. Five Simple Rules for Making Copper Tube Joints. John S. Coe. *Heating, Piping, & Air Conditioning,* v. 25, May 1953, p. 88-89.

Practical pointers for soft soldering. Hard soldering procedures. (K7, Cu)

302-K. Pop Rivet Fasteners for Aircraft. G. C. Bailey and P. C. Ergler. *Product Engineering,* v. 24, May 1953, p. 191-198.

Results of test programs which prove the pop rivet to be worthy of consideration by designers in airframe and other industries. Combines low cost, high strength, and endurance. Tables, graphs, diagrams. (K13)

303-K. Resistance Welding. Then and Now. Joe Harner. *Sheet Metal Worker,* v. 44, May 1953, p. 62, 64-65.

Hypothetical case was used to discuss each step in setting up and placing the welder in operation. (K3)

304-K. Spot Welding of Mild Steel (EN2C) and "Corten" Low Alloy Steel for Structural Purposes. W. S. Simmie. *Welding and Metal Fabrication,* v. 21, May 1953, p. 170-174.

Materials, test procedure, and results. Graphs, tables, photographs. (K3, CN, AY)

305-K. Flash Welding High Tensile Steel Tubes. H. Brooks. *Welding and Metal Fabrication,* v. 21, May 1953, p. 177-184.

Measurements were made to determine the effects of process variables on temperatures produced in high-tensile alloy steel tubes by flashing phase of the welding cycle. Most important effects are flashing distance and speed. Graphs. (K3, AY)

306-K. Practical Aspects of Welding and Metalworking. *Welding and Metal Fabrication,* v. 21, May 1953, p. 185-186.

Fabrication of wrought brass, high-tensile brasses, and preparation of sheet and plate. (K general, G general, Cu)

307-K. (French.) **Resistance Welding of Light Metals.** Charles Guinard. *Revue de l'Aluminium,* v. 29, no. 193, Nov. 1952, p. 417-422; v. 30, no. 195, Jan. 1953, p. 35-40; v. 30, no. 196, Feb. 1953, p. 67-74. (Concluded.)

Part I: Various aspects of the technique. Part II reviews machines which can be fixed or mobile in the case of clamp units. Part III: Adjustment and checking of test pieces, as well as the parameters of spot welding. Roller and butt welding are included. (K3, Al)

308-K. (Spanish.) **Causes and Remedies of the Most Common Troubles in Arc Welding.** *Fusion de Metals,* v. 16, no. 2, Apr., May, June 1953, p. 7-10.

Four points necessary for good welding; proper electrode, arc length, speed, and adequate current. (K1)

309-K. Rubber Strip Adhesion Tester. S. A. Eller. *ASTM Bulletin,* May 1953, p. 41-42.

Apparatus used in measuring force required to separate a rubber strip from a metal base at a definite jaw separation speed and with the separating force applied at right angles to the base. (K12)

310-K. Bonding Plasticized P.V.C. to Metal. A. Blake. *British Plastics,* v. 26, May 1953, p. 160.

Experiments with various methods of bonding. (K11)

311-K. Speeding Soldering of Automobile Radiator Sections. *Industrial Gas,* v. 31, May 1953, p. 7.

Method of using heated air which sweats tinned tubular parts together in average of 38 sec. Automatic controls hold air at 550 to 660° F. Diagrams. (K7, S16)

312-K. Synthetic-Resin Adhesives and Their Applications. S. Hopwood. *Plastics Institute, Transactions,* v. 21, Apr. 1953, p. 77-88; disc., p. 88-89.

Various types of adhesives and glues and their applications. Synthetic resins capable of making joints between metals stronger than riveting or welding. (K12, Al)

313-K. Esna's Fascinating Fasteners. *Steel Horizons,* v. 15, no. 2, 1953, p. 10-11.

Describes stainless steel nails, nuts, and other fasteners. Photographs. (K13, T7, SS)

314-K. Some Aluminium-Zinc-Magnesium Alloys. An Examination of Their Tensile Properties and Oxy-Acetylene Welding Characteristics. W. I. Pumphrey. *Welding Research,* v. 7, Apr. 1953, p. 26r-33r.

Properties of typical welds were studied. Copper included in alloy impairs resistance to cracking. Tables, graphs, photographs. 19 ref. (K2, Q27, Al, Mg, Cu, Zn)

315-K. (French and German.) **Aluminothermic Welding of Aluminum Cables.** J. Bollinger. *Aluminium Suisse,* v. 3, no. 2, Mar. 1953, p. 62-65.

New simple process for welding insulated Al cables to be laid underground. Photographs. 11 ref. (K4, Al)

316-K. (French and German.) **Regarding Actual Problems of Welding Research.** Carl G. Keel. *Zeitschrift für Schweisstechnik; Journal de la Soudure,* v. 43, no. 4, Apr. 1953, p. 62-75.

Weldability of high-C, alloyed, and high-alloy austenitic steels. Emphasizes diffusion process and describes electric-arc welding tests. Photographs, graphs, tables. 31 ref. (K9, K1, AY, CN)

317-K. (German.) **Testing of Welding Electrodes and Steels for Their Susceptibility to Weld-Seam Cracking.** Paul Werthebach. *Stahl und Eisen,* v. 73, no. 2, Jan. 15, 1953, p. 84-91.

Tests were made on various steels. Data are tabulated and discussed. 8 ref. (K9, ST)

318-K. (German.) **High-Frequency Overlapping in Electric-Arc Welding Process.** *Zeitschrift für Schweisstechnik; Journal de la Soudure,* v. 43, no. 4, Apr. 1953, p. 76-78.

Parallel ignition apparatus, because of possible faulty connections, cannot be attached to every welding machine. Brown Boveri apparatus usable with a variety of machines. Diagrams. (K1)

319-K. (Russian.) **Effect of Impure Argon on the Quality of Argon-Arc Welding.** A. V. Petrov. *Avtogennoe Delo,* v. 23, no. 9, Sept. 1952, p. 5-8.

Results of investigation using Al alloys. Shows how basic impurities, O_2 and N_2, affect fusability. Suggests minimum purity limits. Diagrams, photographs. (K1, Al)

320-K. (Russian.) **Effectiveness of Heating Metals With an Oxy-Kerosene Mixture.** A. M. Glikshtern. *Avtogennoe Delo,* v. 23, no. 9, Sept. 1952, p. 13.

Describes advantages and compares it with oxy-acetylene heating. Oxy-kerosene was found to be more effective. Graphs. (K2)

321-K. (Russian.) **Use of Welding in Construction of the Volga-Don Canal and Other Communist Structures.** N. N. Rykalin. *Avtogennoe Delo,* v. 23, no. 9, Sept. 1952, p. 14-16.

Use of welding in construction of the canal and a hydroelectric power plant. Considers techniques, equipment, electrodes, and workmen. (K general)

322-K. (Russian.) **Facing Hydro-Turbine Blades.** I. R. Krianin, K. A. Udotov, L. M. Iarovinskii, and V. A. Lapidus. *Avtogennoe Delo,* v. 23, no. 9, Sept. 1952, p. 17-21.

Spot and butt welding of stainless steel plates to low-alloy turbine blades. Tests results for corrosion, cavitation, and corrosion-fatigue properties. Tables, photographs. (K3, R2, T25, SS, CN)

323-K. (Russian.) **Semi-Automatic Spot Welding Thin Sheet Structures At Right Angles.** M. R. Shraerman, B. G. Iungelson, and S. B. Petelina. *Avtogennoe Delo,* v. 23, no. 9, Sept. 1952, p. 21-24.

Use and advantages of regular and corner spot welding techniques. Graphs, tables. (K3)

324-K. (Russian.) **Multi Pass Submerged Arc Welding.** V. S. Volodin. *Avtogennoe Delo,* v. 23, no. 9, Sept. 1952, p. 26-28.

How increased production results. Tables. (K1)

325-K. (Russian.) **Progressive Welding Methods in the Zaporozhe Machinery Factory "Kommunar".** P. S. Volodin and S. E. Chernovol. *Avtogennoe Delo,* v. 23, no. 9, Sept. 1952, p. 28-30.

Advantages of automatic welding and operations involved. (K general)

L

CLEANING, COATING AND FINISHING

272-L. Brake Disks Deburred on Special Fixtures in Rotating Barrels. W. J. Hobday. *Automotive Industries,* v. 108, May 1, 1953, p. 53, 102.

Equipment for deburring SAE 1035 disks. Photographs. (L10, CN)

273-L. Tin Plate Now Being Manufactured by Completely Modern West Coast Mill. T. G. Simison and M. C. King. *Blast Furnace and Steel Plant,* v. 41, May 1953, p. 489-496, 502.

Continuous pickler, cold reduction, electrolytic cleaning, annealing department, temper rolling, coil preparation, flying shear line, hot dip tinning, and electrolytic tinning. Photographs. (L16, L17, J23, F23, CN, Sn)

274-L. Properties of Electrodeposited Nickel. *Canadian Metals,* v. 16, May 1953, p. 38, 40, 42.

Study of conditions during the electrodeposition of Ni shows that properties such as hardness, tensile strength, and others can be varied over a wide range by proper choice of plating bath. (L17, Q27, Q29, Ni)

275-L. A Method for Determining the Resistance of Insulating Joints and Pipe Line Coatings. H. F. Koester. *Corrosion* (Technical Section), v. 9, May 1953, p. 159-162.

Method which combines field resistance measurements and algebraic computations of true resistances. Detailed instructions are given for placement of test points and the formulas are explained. Special method for use with poorly coated or uncoated pipe lines. Diagrams. (L26)

276-L. Report on Surface Preparation of Steels for Organic and Other Protective Coatings. *Corrosion* (Technical Section), v. 9, May 1953, p. 173-185.

Mechanical and chemical surface preparation processes, conditioners and pretreatments for organic and

other coatings that have been used commercially. Surface preparation practices for galvanized surfaces; maintenance and repair conditioning of surfaces and coatings; and assembly of dissimilar metals. (L general, ST)

277-L. Electrodeposition of Copper From the Monoethanolamine Bath. T. L. Rama Char and N. B. Shivaraman. *Electrochemical Society, Journal,* v. 100, May 1953, p. 227-231.
Detailed description. Tables. 17 ref. (L17, Cu)

278-L. Electrodeposition of Cadmium From Fluoborate Solutions. T. R. Anantharaman and J. Balachandra. *Electrochemical Society, Journal,* v. 100, May 1953, p. 232-236.
Effects of variables on plating characteristics of the Cd fluoborate solutions were studied to deduce optimum conditions for electroplating Cd. Tables. (L17, Cd)

279-L. Electrogalvanizing From Fluoborate Solutions. T. R. Anantharaman and J. Balachandra. *Electrochemical Society, Journal,* v. 100, May 1953, p. 237-239.
Investigations made to determine optimum conditions for electroplating Zn from its fluoborate solution. Compares best fluoborate bath with baths presently used for electrogalvanizing. Tables. (L17, Zn)

280-L. Studies in the Discontinuities of Electrodeposited Metallic Coatings. Parts II and III. S. C. Shome and U. R. Evans. *Electrodepositors' Technical Society, Journal,* v. 27, 1950-51, p. 45-74; disc., p. 75-89.
Part II: Two methods were developed for measuring total uncovered area of a plated specimen. Part III: Theoretical principles underlying porosity tests for metallic coatings on steel. Graphs, diagrams. 17 ref. (L17, ST)

281-L. The Development of Tin-Zinc Alloy Plating in the U. S. A. Frederick A. Lowenheim and Robert M. MacIntosh. *Electrodepositors' Technical Society, Journal,* v. 27, 1950-51, p. 115-128.
Presents operating data for the all-potassium bath and explains a discrepancy between English and American results using the Na bath. Tables and graphs. 12 ref. (L17, Zn, Sn)

282-L. The Electrodeposition of Bright Tin-Nickel Alloy Plate. N. Parkinson. *Electrodepositors' Technical Society, Journal,* v. 27, 1950-51, p. 129-151.
Process which deposits a single-phase alloy of Sn and Ni, corresponding to the formula NiSn. Graphs and micrographs. (L17, Ni, Sn)

283-L. The Crystal Structure of Metallic Electrodeposits. G. I. Finch and D. N. Layton. *Electrodepositors' Technical Society, Journal,* v. 27, 1950-51, p. 215-226; disc., p. 227-232.
Bath conditions, crystal growth, and mechanical and physical properties of electrodeposits. Micrographs. (L17, M26, P general, Q general)

284-L. Alkali-Fluoro-Silicate Glasses as Vitreous Enamels for Aluminum. E. C. L. Rao. *Finish,* v. 10, May 1953, p. 31-33, 72-73.
Development of an enamel using the AlF_3-NaF-CaF_2 phase diagram modified by the substitution of Li for Na. Tables. (L27, Al)

285-L. Electroless Nickel Plating. Where It Stands Today. John B. Campbell. *Materials and Methods,* v. 37, May 1953, p. 96-100.
Summarizes the information currently available on "electroless" Ni plating and indicates present and probable future status of the process. (L17, Ni)

286-L. Chromizing Improves Surface Properties of Steels. Richard P. Seelig. *Materials and Methods,* v. 37, May 1953, p. 106-109.

Process which uses a reaction between a gaseous Cr compound and Fe as a means of exchanging iron atoms for Cr at the surface of the steel. Process applicable to low-carbon steels, alloy steel, high-Cr, and other stainless steels. (L15, Cr, CN, AY, SS)

287-L. Immersion "Brass" Coatings on Steel. Hartmut W. Richter. *Metal Finishing,* v. 51, May 1953, p. 66-67, 76.

Immersion plating of steel with Sn and Cu from a $SnSO_4$-$CuSO_4$ bath. (L17, ST, Sn, Cu)

288-L. Surface Coating Protection by the Evaporation-Condensation of the Rarer Metals. *Metal Finishing,* v. 51, May 1953, p. 77. Translated and condensed from *Metalloberflaeche,* v. 6. no. 7, July 1952, p. A109-A110.

Experiments showed that volatile halogen compounds of U, Th, V, Ti, Zr, Hf, Mo, W, and Re are suitable for metallizing in presence of protective gases or in high vacuum. (L25)

289-L. Black Oxide Coatings on Steel. *Metal Finishing,* v. 51, May 1953, p. 77-78. Translated and condensed from *Werkstoffe und Korrosion,* v. 3, no. 7, p. 286.

Coloring agent S2 Schering Black rapidly colors iron and steel parts a deep black. (L14, Fe, St)

290-L. Simultaneous Pickling and Degreasing With the Electro-Alkaline Bath. T. Skutta. *Metal Finishing,* v. 51, May 1953, p. 78-79. Translated and condensed from *Beiztechnik,* v. 1, no. 4, p. 53-54.

Describes Derostan process which combines pickling and degreasing in one process. (L12)

291-L. Statistical Control of Modern Continuous Pickling Bath Lines. W. Fackert. *Metal Finishing,* v. 51, May 1953, p. 79. Translated and condensed.

Previously abstracted from *Stahl und Eisen.* See item 958-L, 1952. (L12, S12, ST)

292-L. How to Combat Corrosion of Metals. R. W. Strauss. *Plant,* v. 7, May 1953, p. 38-46.

Controlling corrosion through use of protective coatings. Surface preparation, material selection, and primer. Photographs. (L general)

293-L. Tin-Nickel Alloy Plate. *Products Finishing,* v. 17, May 1953, p. 42, 44, 46, 48.

Process which consists of depositing Sn and Ni alloy to yield a plate which is both tarnish-resistant and decorative. (L17, Sn, Ni)

294-L. It Will Pay You to Examine Surface Treatment Methods. Allen G. Gray. *Steel,* v. 132, May 18, 1953, p. 92-94, 96.

Developments in surface treatment make it possible to improve adhesion and durability of plated coatings. Chromate treatments for Al, Zn, Cd, Mg, Cu, and brass. (L14, Al, Zn, Cd, Mg, Cu)

295-L. (German.) **Fundamentals of Electrodeposition of Gold in Cyanide Solutions and Its Use in Practice.** B. Wullhorst. *Metalloberfläche,* v. 7, no. 4, Apr. 1953, p. A49-A58.

Fundamentals are discussed particularly for Au plating by diffusion; for electrodeposition of Au alloy coatings, and for processes of separating electrodeposited Au alloys. Photographs, graphs. 9 ref. (L17, Au)

296-L. (German.) **Gold Plating in the Light of Recent Technical and Patent Literature.** Richard Springer. *Metalloberfläche,* v. 7, no. 4, Apr. 1953, p. A61-A64; no. 5, May 1953, p. A76-A79.

A review of patent and other literature on Au plating of different metals. Tables. 109 ref. (L17, Au)

297-L. (German.) **Silver Burnishing Baths.** Gerhard Heilmann. *Metalloberfläche,* v. 7, no. 4, Apr. 1953, p. B53-B58.

Two processes are cited. Difficulties in determining the process termination because of variables such as current density or hardness are discussed. 35 ref. (L17, Ag)

298-L. (German.) **Electroplating With Gold.** Otto Loebich. *Metalloberfläche,* v. 7, no. 4, Apr. 1953, p. B58-B61.

Describes a fine gold plating bath, a Au-Ag plating bath, and a Au-Cu-(Ag) plating bath for corrosion resistant Au films, each having unique characteristics. Use of proprietary materials is recommended. Tables. (L17, Au)

299-L. (German.) **Electroplating Practices With Platinum Metals.** H. L. Grube. *Metalloberfläche,* v. 7, no. 4, Apr. 1953, p. B61-B64.

Industrial Pt, Pd, and Rh plating baths. Pt plating is seldom done, Pd plating is used on small parts, Rh plating is used on jewelry and on electrical contacts. 2 ref. (L17, Pt, Pd, Rh)

300-L. (German.) **Ag Anodes.** E. R. Thews. *Metalloberfläche,* v. 7, no. 4, Apr. 1953, p. B64-B65.

Advantages of high-purity Ag anodes. (L17, Ag)

301-L. (German.) **Protective Lacquer for Silverware.** K. Stark. *Metalloberfläche,* v. 7, no. 4, Apr. 1953, p. B65.

Performance of synthetic resin modified nitrocellulose lacquer with good adhesion. (L26, Ag)

302-L. Increasing the Life of Pulveriser Hammers, Excellent Results With Cobalide. *Australasian Engineer,* Mar. 1953, p. 72a-72b.

Results of experiments for hard facing hammers. (L24, Cr, Fe, Mn)

303-L. Cleaning and Painting Heavy Steel Products. Walter Rudolph. *Industrial Finishing,* v. 29, May 1953, p. 37-38, 40, 42.

Equipment used to support parts to be cleaned and/or painted. Photographs. (L12, L26)

304-L. Printing on Finished Metal by Screen Process. Tony Capua. *Industrial Finishing,* v. 29, May 1953, p. 48-50.

Briefly describes the process. (L26)

305-L. Chemical Plating. *Metal Industry,* v. 82, Apr. 24, 1953, p. 329.

"Kanigen" plating process is said to be capable of plating any article uniformly, regardless of size or shape. Process can be used for production-line plating of steel, Cu, brass, bronze, stainless steel, and Al. (L17, Cu, Al, SS)

306-L. Electroplating on Magnesium. H. K. DeLong. *Metal Industry,* v. 82, Apr. 24, 1953, p. 327-329.

Process which offers a practical means of producing both adherent and protective electrodeposits on Mg. (L17, Mg)

307-L. Metallising of Glass, Ceramic and Plastic Surfaces. R. J. Heritage and J. R. Balmer. *Metallurgia,* v. 47, Apr. 1953, p. 171-174.

Metallizing techniques such as reduction from aqueous solutions, reduction by heat, and evaporation of metals in a vacuum. Comparison of the methods and a survey of their uses. 19 ref. (L23)

308-L. Japanese Electroplating Practice. Ezra A. Blount. *Plating,* v. 40, May 1953, p. 477-482, 487, 497.

State of development of electroplating practice. Processes not used in the U. S., such as Cr plating at room temperature, Daniell cell Cu plating, and oxalic acid anodizing. Photographs. 8 ref. (L17, Cr, Cu, Zn, Ag)

309-L. Tips on Surface Refinishing of Stainless Steel Work. E. M. Rains. *Sheet Metal Worker,* v. 44, May 1953, p. 66-67.

Pictures illustrate finishing and polishing techniques. (L10, L12, SS)

310-L. Silver Dips. Howard Brenner. *Soap and Sanitary Chemicals,* v. 29, May 1953, p. 161, 163, 165, 167, 183.

Principles and chemistry of the tarnish removing solutions. 51 ref. (L12, Ag)

311-L. Protection of Aluminium Front Surface Mirrors by Anodic Oxidation. L. Holland and N. Sutherland. *Vacuum,* v. 2, Apr. 1952, p. 155-159.

Experiments to determine oxide thickness at which response of mirrors was most achromatic. Graphs. (L19, Al)

312-L. (French.) **Improvement of an Electrolytic Polishing Apparatus.** P. Rocquet and G. Jegaden. *Métaux Corrosion—Industries,* v. 28, no. 239, Jan. 1953, p. 28-32.

Equipment which may permit metallographic specimens to be made. Modification has been used successfully by the I.R.S.I.D. for over a year. Micrographs, diagrams. 3 ref. (L13)

313-L. (French.) **Note on Electrolytic Polishing of Aluminum and its Alloys.** Andre Pillon. *Métaux Corrosion—Industries,* v. 28, no. 239, Jan. 1953, p. 33-35.

Use of perchloric and acetic acids. Composition, characteristics, results, and hazards of the bath. Graph, micrographs. 2 ref. (L13, Al)

314-L. (French.) **Measure for Effectiveness of Protective Coatings.** A. Walter. *Métaux Corrosion—Industries,* v. 28, no. 329, Jan. 1953, p. 43-46.

Portable apparatus for determining dielectric strength of protective coatings. Testing in general. Photographs, diagrams. (L general, P15)

315-L. (German.) **Modern Metal-Spraying Guns. Pt. II.** H. Reininger. *Metalloberfläche,* v. 7, ser. A, no. 3, Mar. 1953, p. A40-A47.

Commercially available spraying machines for use with wire, power, or premelted metal. (L23)

316-L. (German.) **Electrolytic Pickling of Iron and Steel in Alkaline Solutions and Melts.** Richard Springer. *Metalloberfläche,* v. 7, ser. A, no. 1, Jan. 1953, p. A9-A12.

Various types of pickling, and advantages and prospects of an electrolytic process. (L13, CI, ST)

317-L. (German.) **Chemical Sharpening of Files.** A. Pollack. *Metalloberfläche,* v. 7, ser. A, no. 1, Jan. 1953, p. A13-A14.

Process which involves alkali cleansing, acid pickling, neutralizing, rubbing, acid etching, oil removal, and re-etching. (L12, CN)

318-L. (German.) **Photographic Reproduction of Anodically Oxidized Aluminium.** W. I. Kirillov and A. S. Kheynman. *Metalloberfläche,* v. 7, ser. A, no. 1, Jan. 1953, p. A14-A15.

The Bekunov-Shostko process for determining the density and porosity of oxide films. (L19, R2, Al)

319-L. (German.) **When Does a Polishing Wheel Crack?** Carl Krug. *Metalloberfläche,* v. 7, ser. B, no. 1, Jan. 1953, p. B3-B4.

Test data. (L10)

320-L. (German.) **Chemical Polishing.** R. Erdmann. *Metalloberfläche,* v. 7, ser. B, no. 1, Jan. 1953, p. B4-B6.

Suitable materials and conditions for polishing. Necessity of pretesting. (L12)

321-L. (German.) **Conversion of Rust.** A. Pollack. *Metalloberfläche,* v. 7, ser. B, no. 3, Mar. 1953, p. B37-B38.

Chemical process for converting the rust on Fe to a protective coating. (L14, Fe)

322-L. (German.) **"Roto-Finish", the New Mechanical Process for Trimming, Grinding, and Polishing Mass-Production Articles. Part I.** H. Nann and H. A. O. Fitzler. *Metalloberfläche*, v. 7, ser. B, no. 3, Mar. 1953, p. B41-B47.

The procedure, substances for mineral grinding and polishing, and "Roto-Finish" compounds. (L10)

323-L. Protective Coatings for Buried Pipelines. K. A. Spencer and H. B. Footner. *Chemistry & Industry*, May 9, 1953, p. 448-455.

Properties required of a coating, selection of materials, and procedures for enameling. Photographs. (L26, CN)

324-L. Comparison of Plastic Tape and Hot Enamels for Protective Coatings of Pipe. N. P. Peifer. *Gas Age*, v. 111, May 21, 1953, p. 41-43, 98, 100.

Cost facts and figures for protection of typical lines by anodes, mill-coated pipe, plastic tape, and over-the-ditch coated pipe. Test procedures used. (L general, CN)

325-L. Electrolytic Polishing of Lead in a Sodium Acetate-Acetic Acid Bath. Elizabeth Jones and H. R. Thirsk. *Nature*, v. 171, May 9, 1953, p. 843.

Polishing specimens for experimental work. (L13, Pb)

326-L. Metal Cleaning Equipment and Methods. John E. Hyler. *Organic Finishing*, v. 14, May 1953, p. 7-10.

Solution-type cleaning, vapor-type degreasers, alkali cleaners, advantages of corrosion resistant coatings, cleaners for Al, oxide removal, and storage of cleaners. Photographs. (L general, Al)

327-L. Finishing Vauxhall Automobiles. W. F. Coxon. *Organic Finishing*, v. 14, May 1953, p. 14-18.

Features of the finishing line. Photographs. (L general, CN)

328-L. The Effect of Flash-Drying Procoat Enamel on Internal Can Temperatures. George W. Grupp. *Organic Finishing*, v. 14, May 1953, p. 19-22.

Investigation to determine fastest method of drying procoat of metal containers without damaging their food contents. Tables. (L26)

329-L. Galvanizing Can be Automatic. Lyle Baker. *Steel*, v. 132, May 25, 1953, p. 170-171.

Use of a chain conveyor to handle all steps in the galvanizing operation. Photographs. (L16)

330-L. Metallizing Gives New Life to Old Parts. *Steel Horizons*, v. 15, no. 2, 1953, p. 24-25.

How the process, using stainless steel, adds life to worn parts. Photographs. (L23, SS)

331-L. Advantages of Hard Chrome Plating in the Corrugator Field. M. P. Boggio. *Tappi*, v. 36, May 1953, p. 170A-171A.

Economy and advantage of plating rolls rather than completely replacing them. (L17, Cr)

332-L. Repainting Steel Water Tanks. J. O. Jackson. *Water & Sewage Works*, v. 100, May 1953, p. R70-R71, R74-R75.

Best-known methods of surface preparation. Suggests several paint systems which have been found to be most dependable and effective in general use. (L26, ST)

333-L. Galvanizing Plant Features Fume, Gas Heating Controls. *Western Metals*, v. 11, May 1953, p. 66-67.

New layout and equipment used in expansion of a Western plant. Photographs. (L16)

334-L. (German.) **Research on Plated Platinum Potentials in the Case of Cathodic Charging With Special Regard for Reversible Hydrogen Electrodes.** F. Tödt and W. Meyer. *Zeitschrift für Elektrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 57, no. 1, 1953, p. 29-33.

Experimental data. Tables, graphs. (L21, Pt)

335-L. (German.) **Coating-Thickness Measurements With β-Rays and Counting Tubes.** R. Berthold. *Zeitschrift des Vereines Deutscher Ingenieure*, v. 95, no. 7, Mar. 1953, p. 207-210.

Reverse radiation was used to measure thicknesses of Cr on Al, Au and Ag on brass, Cu on C, and rubber on Fe. Graphs. 6 ref. (L14, Cr, Al, Au, Ag, Cu, Fe)

336-L. (German.) **Outside Protection of Earth-Laid Cable and Leads by Insulative Protecting Coatings.** Fritz Glander and Wilhelm Glander. *Zeitschrift für Metallkunde*, v. 44, no. 3, Mar. 1953, p. 97-101.

Measures for cutting down damage by stray current. Photographs, graphs. 5 ref. (L26, P15)

337-L. (Russian.) **RP-50 Torches for Manual Surface Dressing.** *Avtogennoe Delo*, v. 23, no. 9, Sept. 1952, p. 31-32.

Advantages of the new torch as compared with RVP-49. (L24)

338-L. (Book.) **Electrodepositors' Technical Society, Journal, (Annual Volume), v. 27, 1950-51.** 337 p. Institute of Metal Finishing, 32, Great Ormond St., London, W. C. 1, England.

Contains 17 papers, five of which are abstracted separately. (L17)

M

METALLOGRAPHY, CONSTITUTION AND PRIMARY STRUCTURES

172-M. Electron Microscope Study of the Effect of the Cold Work on the Subgrain Structure of Copper. Laurence Delisle. *Journal of Metals*, v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 660-666.

Observations on annealed and deformed single crystals and polycrystalline samples of Cr. Micrographs. 19 ref. (M27, Cu)

173-M. Observations on the Phase TiAg. R. J. Van Thyne, W. Rostoker, and H. D. Kessler. *Journal of Metals*, v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 670-671.

Preparation and examination of samples. (M24, Ti, Ag)

174-M. On the Distribution of Sodium in Modified Al-Si Alloys. A. B. Michael and M. B. Bever. *Journal of Metals*, v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 679-680.

Experiments to investigate the partition of Na between the primary Al-rich solution and the eutectic. Micrographs. (M26, Al, Na)

175-M. Revealing the Subgrain Structure of Aluminum. M. S. Hunter and D. L. Robinson. *Journal of Metals*, v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 717-722.

Extremely fine subgrain structure found in Al and Al alloys is shown and a method for revealing this structure is described. Appearance and some characteristics of this structure. Possible significance of subgrain structure in terms of chemical, electrochemical, and metallurgical processes. Micrographs. (M27, Al)

176-M. Alpha Solid-Solution Area of the Cu-Mn-Sn System. C. W. Funk and J. A. Rowland. *Journal of Metals*, v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 723-725.

Metallographic study. Evaluated results are illustrated with isothermal diagrams for 100° C. increments between 350 and 750° C. Diagrams and micrographs. 13 ref. (M24, Cu, Mn, Sn)

177-M. Calculation of Electron-Density Distribution in Crystals With the Help of Convolution Operations. R. Hosemann and S. N. Bagchi. *Nature*, v. 171, May 2, 1953, p. 785-787.

Mathematical analysis. (M25)

178-M. Isothermal Annealing Effects in Irradiated Copper. Albert W. Overhauser. *Physical Review*, v. 90, May 1, 1953, p. 393-400.

Annealing studies which were part of investigation to study basic properties of lattice imperfections introduced into metals by bombardment with fast particles. Graphs. (M26, J23, Cu)

179-M. Observations of Dislocations in Lineage Boundaries in Germanium. F. L. Vogel, W. G. Pfann, H. E. Corey, and E. E. Thomas. *Physical Review*, v. 90, May 1, 1953, p. 489-490.

Briefly describes study. (M26, Ge)

180-M. A New External Objective Aperture Centering and Interchanging Device for the RCA EMU Electron Microscope. Francis W. Bishop. *Review of Scientific Instruments*, v. 24, Apr. 1953, p. 269-271.

Device which quickly interchanges and centers up to seven objective apertures in the electron microscope consists of a Pt-Ir aperture-carrying tongue which may be moved longitudinally and laterally through a sylphon bellows arrangement. Photographs. (M21, Pt, Ir)

181-M. Direct Measurement of Images in the Electron Microscope. H. Froula. *Review of Scientific Instruments*, v. 24, Apr. 1953, p. 304-306.

Method and a working model for making rapid, moderately accurate measurements of images directly on the fluorescent screen of an electron microscope without the usual intermediate photography. Photographs. (M21)

182-M. A Step Wedge for Sensitometry With the Electron Microscope. J. Hamilton. *Review of Scientific Instruments*, v. 24, Apr. 1953, p. 309-312.

New method of making intensity-scale electron exposures on a photographic emulsion directly in the electron microscope. Contrast and sensitivity of the test emulsion relative to that of the emulsion selected as a standard can be determined quickly and accurately. Characteristics of graininess and sharpness of the test emulsion can readily be evaluated. Graphs. (M21)

183-M. (French.) **High Magnification of Metallic Surfaces.** G. Vandermeeresche. *Ossature Metallique*, v. 18, no. 4, Apr. 1953, p. 221-225.

Application of the electron microscope. Photographs, diagrams. (M21)

184-M. The Relationship Between Metallic Radii in Body-Centered Cubic and Close-Packed Structures. J. Thewlis. *American Chemical Society, Journal,* v. 75, May 5, 1953, p. 2279-2280.

Discusses previous calculations using Fe, Ti, Zr, and Tl. (M26, Fe, Ti, Zr, Tl)

185-M. Equilibrium Relations at 460° C. in Aluminium-Rich Alloys Containing 0.7% Copper, 0.7% Magnesium, and 0.6% Silicon. H. J. Axon. *Institute of Metals, Journal,* v. 81, May 1953, p. 449-450.

Results of an investigation into the equilibrium constitution at 460° C. of Al-rich alloys. (M24, Al, Cu, Mg, Si)

186-M. The Constitution of Nickel-Rich Alloys of the Nickel-Chromium-Aluminium System. A. Taylor and R. W. Floyd. *Institute of Metals, Journal,* v. 81, May 1953, p. 451-464.

Equilibrium relationships in alloys containing more than 50 at. % Ni were studied over the temperature range 750-1150° C. The phase fields of the nickel primary solid solution, γ, and of the β solid solution based on NiAl both contract as the temperature falls, whereas that of the γ' phase based on Ni_3Al extends. Graphs, tables. 15 ref. (M24, Ni, Cr, Al)

187-M. Photomicrography in Ultra-Violet Light. E. Wilfred Taylor. *Metal Industry,* v. 82, Apr. 24, 1953, p. 325-326.

Use of ultraviolet radiations as a means of increasing resolution and discriminating between otherwise similar constituents. Micrographs. (M21)

188-M. The Foundations of Metallography. F. C. Thompson. *Metallurgia,* v. 47, Apr. 1953, p. 175-178.

Survey of the state of metallographic knowledge 50 years ago. The existence of several phenomena which only recently were studied extensively was at least surmised, and in some cases known. (M general, A2)

189-M. Neutron Cross Sections in the Mev Region. Murrey D. Goldberg. *Nucleonics,* v. 11, May 1953, p. 42-45.

Problems and progress in work on neutron cross sections. 9 ref. (M25)

190-M. (French.) **Physical Chemistry. Reaction Speeds in the System, Iron—Methane—Hydrogen and Its Contribution to the Iron-Carbon Diagram.** Gaston Collette and Léon Jacqué. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 236, no. 12, Mar. 23, 1953, p. 1267-1268.

New information about the Fe-C diagram. Graphs. 4 ref. (M24, Fe)

191-M. (German.) **Study of Cu-Mn-Sn System.** Siegfried Valentiner. *Zeitschrift für Metallkunde,* v. 44, no. 2, Feb. 1953, p. 59-64.

Crystalline Cu_2MnSn passes, at lower temperatures, into Cu_5Mn_4Sn which is stable at room temperature. It is ferromagnetic and has a Curie point lower than that of the original crystal. (M26, Cu, Mn, Sn)

192-M. (German.) **Remarks on the Work of J. Gurland and J. T. Norton on Substructural Formation of Hard Metals.** Walther Dawihl. *Zeitschrift für Metallkunde,* v. 44, no. 2, Feb. 1953, p. 69-70.

Discusses Norton's conclusions pertaining to substructures in WC-Co products. Special attention is given to properties of the Co-rich interlayers. (M27, H11, W, Co)

193-M. (German.) **Longitudinal Field Filters for Electron Diffraction and Electron Microscopy.** H. Boersch. *Zeitschrift für Physik,* v. 134, no. 2, 1953, p. 156-164.

Further development of longitudinal field theory. Result is "grid" and "lens" filters of greater selectivity. (M21, M22)

194-M. A Method of Observing Selected Areas in Electron and Optical Microscopes. J. F. Nankivell. *British Journal of Applied Physics,* v. 4, May 1953, p. 141-143.

Technique enabling systematic observations of metallurgical features in the electron microscope. Permits direct comparison of electron and photomicrographs of any surface detail. Iron-carbon alloy (0.044% C) was used in experiments. Micrographs. (M21, Fe)

195-M. A Model for Demonstrating Dislocations in Crystals. H. G. Van Bueren. *British Journal of Applied Physics,* v. 4, May 1953, p. 144-145.

Simple dynamic model, in which the interatomic forces are simulated partially by magnetic forces and partially by the elastic forces exerted by small springs. Movement of edge and screw dislocations through a crystal lattice can easily be demonstrated. Photographs. (M26)

196-M. The Measurement of X-Ray Line Breadths. T. R. Anantharaman and J. W. Christian. *British Journal of Applied Physics,* v. 4, May 1953, p. 155-156.

Simple analytical methods for finding the position of the α_1 peak and the integral breadth of the α_1 component of a composite Debye-Scherrer powder line are described. Expressions are exact for symmetrical lines, and sufficiently accurate for very broad asymmetrical lines. Problem of correct location of the background level is considered. (M22)

197-M. A Method for the Quantitative Determination of Preferred Orientation. L. K. Jetter and B. S. Borie, Jr. *Journal of Applied Physics,* v. 24, May 1953, p. 532-535.

A new method for the study of preferred orientation in polycrystalline materials with a Geiger counter X-ray spectrometer is described. Diagrams, photographs, charts. (M23, S11)

198-M. The Effect of a Soller Slit on the Diffraction of X-Rays by Deformed Crystals. B. D. Cullity and Carl A. Julien. *Journal of Applied Physics,* v. 24, May 1953, p. 541-546.

The diffraction geometry of a beam is examined in detail. Shows that striations are due to torsion of the crystal. (M22, N1, Cu, Al)

199-M. The X-Ray Shadow Microscope. V. E. Cosslett and W. C. Nixon. *Journal of Applied Physics,* v. 24, May 1953, p. 616-623.

Practical limitations to resolution, contrast, and exposure time. Diagrams, photographs. 22 ref. (M21)

200-M. Titanium Replica for Electron Microscopy. Shigeto Yamaguchi and Tadayuki Nakayama. *Journal of Applied Physics,* v. 24, May 1953, p. 658.

Making Ti film. Photographs. (M21, Ti, W)

201-M. A Method of Preparing Replicas for Electron Microscopic Examinations. W. S. Smith and W. G. Kirchgessner. *Journal of Applied Physics,* v. 24, May 1953, p. 662.

A modification of the "Formvar" process for making replicas of specimens for electron microscopic examination is described. Photographs. 6 ref. (M21)

202-M. X-Ray Crystallography. Oliver S. Heavens. *Laboratory Practice,* v. 2, May 1953, p. 229-235.

Uses of X-ray diffraction. Experimental arrangements necessary for production of an X-ray beam and for obtaining X-ray patterns. Diagrams. (M22, S11)

203-M. A Surface Contribution to the Debye Specific Heat. R. Stratton. *Philosophical Magazine,* v. 44, May 1953, p. 519-532.

Calculation based on the representation of the possible modes of vibration by points in wave number planes. (M22, Q9)

204-M. (German.) **Structural Composition and Aging of Cu-Mn-Si Alloys.** K. L. Dreyer, *Metall,* v. 7, no. 5 and 6, Mar. 1953, p. 186-189.

By aid of thermal analysis and structural observation, quasibinary section $Cu\text{-}Mn_5\text{-}Si_3$ was determined. Course of solubility boundary of intermetallic phase in Cu was followed. Micrographs, graphs, 3 ref. (M24, Cu, Mn, Si)

205-M. (German.) **Crystal Chemistry of the B-Metals.** Konrad Schubert. *Zeitschrift für Metallkunde,* v. 44, no. 3, Mar. 1953, p. 102-107.

Arguments for crystalline structures of several B-metals, using their correlative positions and block models of electronic theory. Includes experimental data. Diagrams. 21 ref. (M26, As, Sb, Bi)

206-M. (Book.) **X-Ray Crystallography.** Ed. 5. R. W. James. 101 p. 1952. Methuen and Co., London. 7s. 6d.

Covers subject from law of rational indices to Fourier projections and Harker-Kasper inequalities. (M26)

207-M. (Book-German.) **(Outline of Crystal Chemistry.) Grundriss der Kristallchemie.** Johannes E. Hiller. 307 pages. 1952. Walter de Gruyter & Co., Berlin, W 35, Germany.

Comprehensive discussion of various aspects of lattice formations. Lattices of binary and tertiary compounds are included. (M26)

N

TRANSFORMATIONS AND RESULTING STRUCTURES

127-N. Orienting Grains in Transformer Steel. Michael J. Bolton. *General Electric Review,* v. 56, May 1953, p. 13-16.

Shows that size and weight of distribution transformers have decreased greatly as a result of orienting grains. Mechanism of grain nucleation and subsequent growth. Graphs. (N2, N3, AY)

128-N. Diffusion and Oxidation of Solid Metals. C. E. Birchenall. *Industrial and Engineering Chemistry,* v. 45, May 1953, p. 907-911.

Investigation of diffusion in metallic solid solutions and the oxidation of metals and alloys. 103 ref. (N1, R2)

129-N. Martensite Habit Plane in Quenched Ti-Mn Alloys. You Chao Liu and Harold Margolin. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 667-670.

Investigation of martensite habit plane in water-quenched Ti-Mn alloys was carried out on Mn contents between 4.35 and 5.25%. Micrographs and diagrams. (N9, Ti, Mn)

130-N. Recrystallization of a Cold-Rolled Copper Single Crystal. Y. C. Liu and W. R. Hibbard, Jr. *Jour-*

nal of Metals, v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 672-679.

Investigation based on pole figure data and microstructural observations. Shows that relative intensity of deformation stresses on various slip planes can be correlated with the choice of poles affecting the rotations found in the recrystallized orientations. Diagrams and micrographs. 22 ref. (N5, Cu)

131-N. Rate of Formation of Isothermal Martensite in Fe-Ni-Mn Alloy. R. E. Cech and J. H. Hollomon. *Journal of Metals*, v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 685-689.

Results obtained on the isothermal transformations from −79 to −196° C. Graphs and micrographs. (N8, Fe, Ni, Mn)

132-N. Identification of the Precipitate Accompanying 885° F Embrittlement in Chromium Steels. R. M. Fisher, E. J. Dulis, and K. G. Carroll. *Journal of Metals*, v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 690-695.

Experimental results indicate the formation of a submicroscopic precipitate during embrittlement. Measurements by electron, X-ray diffraction, and magnetic techniques. Micrographs. 20 ref. (N7, AY)

133-N. Densification and Kinetics of Grain Growth During the Sintering of Chromium Carbide. H. J. Hamjian and W. G. Lidman. *Journal of Metals*, v. 5, 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 696-699.

Experimental procedure and results of the study. Micrographs and graphs. (N3, H15, Cr, C-n)

134-N. Pearlitic Rim in Blackheart Malleable Iron. *British Cast Iron Research Association Journal of Research and Development*, v. 4, Apr. 1953, p. 522-524.

Occurrence and probable causes of pearlitic rim. (N8, CI)

135-N. On the Kinetics of the Disorder-Order Transformation in Cu_3Au. Norman W. Lord. *Journal of Chemical Physics*, v. 21, Apr. 1953, p. 692-699.

Isothermal order-dependent change in Young's modulus of a single crystal of Cu_3Au was measured as a function of time at various temperatures from 279.3° C. to 384.3° C. Time variations indicate two distinct stages of the disorder-order transformation. Initial stage is described as the formation of contiguous, antiphase, ordered domains by means of normal atomic interdiffusion. Graphs, tables. 14 ref. (N10, Cu, Au)

136-N. Deterioration of Metals. Relative Costs of Alternate Types of Reactor Vessel Construction. I. E. Boberg and W. R. Fickett. *Petroleum Processing*, v. 8, May 1953, p. 690-692.

Economic aspects of pressure vessel design as influenced by a consideration of graphitization of metal at elevated temperatures. (N8, T29, CN)

137-N. How Serious Is Graphitization? R. J. Fiorentino and A. M. Hall. *Petroleum Refiner*, v. 32, May 1953, p. 132-136.

Investigation of graphitization as the cause of vessel failures. Tests and results. Micrographs. (N8, CN)

138-N. (French.) Principle of a Molecular Theory of the Rayleigh Diffusion in Crystals. Lucienne Taurel. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 236, no. 7, Feb. 16, 1953, p. 682-684.

Rayleigh diffusion through a cubic crystal whose elementary network contains only one atom. (N1)

139-N. (French.) Diffusion of Ions Across Electrolytic Metallic Coatings. Helmy Makram. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 236, no. 9, Mar. 2, 1953, p. 920-921.

Studies at uniform thickness, noting time variation necessary for tagged ions to appear in solution as a result of the Cu^{++} concentration. Graphs. (N1, Cu)

140-N. (German.) Crystallization of Cast Iron With Nodular Graphite. A. Wittmoser. *Giesserei*, v. 40, no. 3, Feb. 5, 1953, p. 75-85.

Experimental data which support the hypothesis regarding formation of nodular graphite from the carbon-supersaturated solid solution. (N12, CI)

141-N. (German.) Chromium Diffusion in Steel. Walter Katz. *Werkstoffe und Korrosion*, v. 4, no. 2, Feb. 1953, p. 49-57.

Practical and theoretical aspects of the process. (N1, Cr, ST)

142-N. (German.) Computation of Diffusion Coefficients for Mono and Multiphase Diffusion in Solid Alloys. Theo Heumann. *Zeitschrift für physikalische Chemie*, v. 201, no. 3-4, Dec. 1952, p. 168-189.

Theoretical discussion. (N1)

143-N. Evaporation of Germanium Films From a Carbon Crucible. K. Lehovec, J. Rosen, A. MacDonald, and J. Broder. *Journal of Applied Physics*, v. 24, May 1953, p. 513-514.

Determines the rate of Ge evaporation in a vacuum as a function of temperature. Photographs, graphs, tables. 5 ref. (N16, Ge)

144-N. Growth of Cadmium Sulfide Crystals. M. E. Bishop and S. H. Liebson. *Journal of Applied Physics*, v. 24, May 1953, p. 660-661.

Two methods of growing cadmium sulphide crystals. Diagram. (N12, Cd)

145-N. (French.) Physics of Metals. Generalities and Theoretical Considerations on Recrystallization. C. Crussard. *Metaux Corrosion-Industries*, v. 28, no. 330, Feb. 1953, p. 47-68.

General review. Al is used to illmicrographs. 59 ref. (N5, Al, Cu, Mg, Zn, Cd, Ti, Zr, Fe)

146-N. (German.) Observations on Subcooling From Conversion Processes as a Basis for Conversion of Martensite. Edward Houdremont and Otto Krisement. *Archiv für das Eisenhüttenwesen*, v. 24, no. 1-2, Jan.-Feb. 1953, p. 53-68.

Conversion temperature was characterized thermodynamically by fact that free energies of both phases are alike. Honda formula was used to compute temperature hysteresis, A_3 conversion of pure Fe, and conversions of alloys. Graphs. 36 ref. (N8, Fe, AY)

147-N. (Book.) Gases in Metals. 204 p. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland, 3, Ohio. $3.00.

Includes "Fundamental Metallurgical and Thermodynamic Principles of Gas-Metal Behavior", D. P. Smith; "Gases in Nonferrous Metals and Alloys", L. W. Eastwood; "Gases in Liquid Iron and Steel", D. J. Carney; and "The Behavior of Gases in Solid Iron and Steel"; C. E. Sims. (N1, N15, P12, Fe, ST, EG-a)

P

PHYSICAL PROPERTIES AND TEST METHODS

257-P. Distribution of Conductivity Within Dielectric Films on Aluminum. J. E. Lilienfeld and Charles Miller. *Electrochemical Society, Journal*, v. 100, May 1953, p. 222-226.

Studies made to determine electrical performance of the condenser film on anodized Al. Data were obtained by drawing a correlation between the physical components of the condenser and the electrical components of a model circuit. (P15, Al)

258-P. Thermal Conductivity Data Presented for Various Metals and Alloys Up to 900° C. L. Silverman. *Journal of Metals*, v. 5, May 1953, p. 631-632.

Method for determining the data. Graphs and tables. (P11)

259-P. Effect of Dissolved Sulphur on the Surface Tension of Liquid Copper. C. F. Baes, Jr. and H. H. Kellogg. *Journal of Metals*, v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 643-648.

Measurement by a sessile-drop method at 1120° C. Degree of adsorption of S on the liquid Cu surface was calculated and various models of the surface layer were tested against the results. Diagrams. (P12, Cu)

260-P. Free Energy of Vaporization of Metals from 0° to 2000° C. J. W. Evans. *Journal of Metals*, v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 655-657.

Presents graphically the free energies of vaporization of a number of metals of economic importance which can be used in conjunction with other free-energy diagrams. (P12)

261-P. Vapor Pressure of Silver. C. Law McCabe and C. Ernest Birchenall. *Journal of Metals*, v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 707-709.

Redetermination of vapor pressure under conditions permitting precise temperature measurement. Graphs. (P12, Ag)

262-P. Vapor Pressure of Silver Over Silver-Gold Solid Solutions. C. L. McCabe, H. M. Schadel, Jr., and C. E. Birchenall. *Journal of Metals*, v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 709-711.

Describes measurements. Orifice effusion was compared with electromotive force measurement as a means for determining thermodynamic activities in these solid metallic alloys. Correlated activity coefficients are given for Ag-Au alloys from 200 to 1000° C. Graphs and table. (P12, Ag, Au)

263-P. Notes on Melting of Cadmium Scrap for Anodes. L. Apelt. *Metal Finishing*, v. 51, May 1953, p. 78. Translated and condensed.

Previously abstracted from *Metalloberflaeche*. See item 451-P, 1952. (P12, E10, Cd)

264-P. Half-Life of Pd and Neutron Activation Cross Section of Pd. W. Wayne Meinke. *Physical Review*, v. 90, May 1, 1953, p. 410-412.

Experimental determination. (P13, Pd)

265-P. The $Zn^{64}(d, \alpha n)Cu^{61}$ Reaction. C. Sharp Cook and Fred T. Porter. *Physical Review*, v. 90, May 1, 1953, p. 429.

Relative cross sections for the $Zn^{64}(d, \alpha n)Cu^{61}$ and $Zn^{66}(d, \alpha)Cu^{64}$ reactions were determined from β-ray data. (P10, Zn, Cu)

266-P. The Radioactive Decay of Cs^{134}, Os^{185}, Os^{191}, and Os^{193}. J. M. Cork, J. M. LeBlanc, W. H. Nester, D. W. Martin, and M. K. Brice. *Physical Review*, v. 90, May 1, 1953, p. 444-447.

Deals with each individually. (P13, Cs, Os)

267-P. Relative Abundances and Neutron Capture Cross Sections of the Neodymium Isotopes. W. H. Walker and H. G. Thode. *Physical Review*, v. 90, May 1, 1953, p. 447-448.

Double-focusing mass spectrometer was used to determine the relative isotopic abundances of naturally-occurring Nd and the relative isotopic neutron capture cross sections. Relative abundances are compared with the results previously published. (P10, Nd)

268-P. On the Interaction of 95-Mev Protons With D, Li, Be, C, Al, Cu, and Pb Nuclei. J. A. Hofmann and K. Strauch. *Physical Review*, v. 90, May 1, 1953, p. 449-460.

Describes measurement made of the energy distribution of neutrons emitted from various targets at angles of 0, 5, 10, 16, and 28° with respect to the primary 95-Mev proton beam. Diagrams, graphs, and tables. (P10, Be, Al, Cu, Pb)

269-P. The (α,n) and $(\alpha,2n)$ Cross Sections of Ag^{109}. E. Bleuler, A. K. Stebbins, and D. J. Tendam. *Physical Review*, v. 90, May 1, 1953, p. 460-463.

Excitation curves for the reactions were measured for α-energies up to 19.5 Mev. Graphs. (P10, Ag)

270-P. Isomerism of In^{110} and In^{112}. E. Bleuler, J. W. Blue, S. A. Chowdary, A. C. Johnson, and D. J. Tendam. *Physical Review*, v. 90, May 1, 1953, p. 464-468.

Decay was investigated by β-ray spectrometer and coincidence measurements. Graphs. (P13, In)

271-P. Reversal of Spontaneous Magnetization as a Function of Temperature in LiFeCr Spinels. E. W. Gorter and J. A. Schulkes. *Physical Review*, v. 90, May 1, 1953, p. 487-488.

Describes investigation of $Li_{0.5}{}^{+}Fe_{2.5-a}{}^{3+}Cr_a{}^{3+}O_4{}^{2-}$ between $a = 0$ and 2.0. (P16, Fe, Cr)

272-P. Anomalous Behavior of the g Factor of LiFeCr Spinels as a Function of Temperature. J. S. van Wieringen. *Physical Review*, v. 90, May 1, 1953, p. 488.

Measurement of ferromagnetic resonance absorption of polycrystalline samples. (P16, Fe, Cr)

273-P. Semiconducting Intermetallic Compounds. R. G. Breckenridge. *Physical Review*, v. 90, May 1, 1953, p. 488-489.

Considers InSb, GaSb, and AlSb. (P15, In, Sb, Ga, Al)

274-P. Synchrocyclotron Production and Properties of Magnesium 28. John W. Jones and Truman P. Kohman. *Physical Review*, v. 90, May 1, 1953, p. 495-496.

Describes determination of half-life for Mg^{28} and Al^{28}. (P13, Mg, Al)

275-P. Dysprosium 157. Thomas H. Handley and Elmer L. Olson. *Physical Review*, v. 90, May 1, 1953, p. 500-501.

Determination of 8.2 ± 0.1 hour activity. Graphs. (P13, Dy)

276-P. The Solubility of Indium in Mercury. William M. Spicer and Cyril J. Banick. *American Chemical Society, Journal*, v. 75, May 5, 1953, p. 2268-2269.

Investigation of entire range of compositions by means of cooling curves. (P13, In, Hg)

277-P. Concerning the Low Temperature Specific Heat of Tellurium. Warren DeSorbo. *Journal of Chemical Physics*, v. 21, Apr. 1953, p. 764-765.

Results of the analysis of specific heat data. (P12, Te, Se)

278-P. Nuclear Power Plants. Design and Performance of Liquid-Metal Heat Exchangers and Steam Generators. R. D. Brooks and A. L. Rosenblatt. *Mechanical Engineering*, v. 75, May 1953, p. 363-368.

Testing of equipment described resulted in better understanding of design aspects for liquid-metal heat exchange equipment. Heat transfer coefficients for shell-side conditions were evaluated. Graphs. (P11, T5, Na, K)

279-P. Semiconducting Films. W. M. Becker and K. Lark-Horovitz. *National Electronics Conference, Proceedings*, v. 8, 1952, p. 506-509.

Ge thin films were deposited on quartz by thermal dissociation of GeH_4. Hall constant and resistivity of the films were measured as a function of temperature. Graphs. 10 ref. (P15, Ge)

280-P. Properties of Beryllium. Murray C. Udy, Homer L. Shaw, and Francis W. Boulger. *Nucleonics*, v. 11, May 1953, p. 52-59.

Survey of atomic, nuclear, physical, chemical, and mechanical properties of Be. Graphs, tables. 21 ref. (P general, Q general, Be)

281-P. Some Properties of Silicon Point-Contact Transistors. J. W. Granville and W. Bardsley. *Physical Society, Proceedings*, v. 66, sec. B, May 1953, p. 429.

Brief description. (P15, Si)

282-P. The Average Number of Neutrons Emitted in the Spontaneous Fission of 242_{cm}. F. R. Barclay and W. J. Whitehouse. *Physical Society, Proceedings*, v. 66, sec. A, May 1953, p. 447-453.

Average number of neutrons emitted in spontaneous fission of Cm^{242} was measured by a method depending on the device of counting only those neutrons which are detected after the occurrence of a fission. Diagrams. (P13, Cm)

283-P. (French.) **Action of Zinc on Certain Unsaturated Bromides.** Clement Troyanowsky. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 236, no. 6, Feb. 9, 1953, p. 618-619.

Action of Zn on an alcoholic solution of dibromo-1,4 butyn-2, forms 1,3 butadiene. The same product is obtained with tetrabromo-1,2,3,4, butane-2. (P13, Zn)

284-P. (French.) **Experimental Results of the Photomagneto-Electric Effect.** Pierre Aigrain and Hubert Bulliard. *Comptes Rendus hebdomadaires des Seances de l'Academie des Sciences*, v. 236, no. 7, Feb. 16, 1953, p. 672-674.

Results of measuring photomagneto-electric effect of Ge. (P15, Ge)

285-P. (French.) **Measuring the Reflection Powers of Thick Metallic Layers (Au, Pt, Cr) in the Schumann Region. Determination of Optical Constants.** Simone Robin. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 236, no. 7, Feb. 16, 1953, p. 674-676.

Experimental results. Charts show curves representing reflector power at 18° and 45° angles of incidence for the three metals. (P17, Au, Pt, Cr)

286-P. (French.) **Some Characteristic Reactions of Metals in Connection With Typical Organic Structures.** Pierre Bevillard. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 236, no. 7, Feb. 16, 1953, p. 711-714.

A brief outline of the interactions of the ortho-diphenol group and the substituted amine function in the triphenylmethane group. (P13)

287-P. (French.) **Establishment of Thermo-Electric Power for Very Small Temperature Differences.** Jean Savornin and France Savornin. *Comptes Rendus hebdomadaires des Séances de l'Academie des Sciences*, v. 236, no. 9, Mar. 2, 1953, p. 898-900.

Research on Si-type p semiconductor. (P15, Si)

288-P. (French.) **Electrical Conductivity of Different Samples of High Purity Aluminum at Low Temperature.** Michel Caron. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 236, no. 11, Mar. 16, 1953, p. 1169-1171.

Graphs. 3 ref. (P15, Al)

289-P. (French.) **Nuclear Physics. Study of Zn^{65} Radiation.** Mitsuo Sakai and Pierre Hubert. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 236, no. 12, Mar. 23, 1953, p. 1249-1251.

Discusses γ radiation of Zn^{65}, its β^+ spectral conversion coefficient, and the relation $N\gamma/N\beta^+$ using a spectrometer with a magnetic prism. 6 ref. (P13, Zn)

290-P. (German.) **Studies on the Behavior of Ferrous Metals in Electrodes.** G. Kröncke and G. Masing. *Wersktoffe und Korrosion*, v. 4, no. 3, Mar. 1953, p. 86-95.

No differences in potential were found between hexagonal and cubical forms of Co. Polarization of Co resulted in formation of hysteresis loop. Work was also done on Ni and Fe. (P15, Co, Ni, Fe)

291-P. (German.) **Metallic Migration on Contacts Made of Super-Structured Alloys.** Albert Keil and Carl-Ludwig Meyer. *Zeitschrift für Metallkunde*, v. 44, no. 1, Jan. 1953, p. 22-26.

Presents a survey of forms of appearance and possible meanings of the effect of metallic migration on circuit-breakers. Tests on Pd-Cu and Au-Cu contacts showed almost no migration. (P15, Cu)

292-P. (French.) **Time Changes in Thermionic Thoria Cathodes.** G. Mesnard. *Vide, Le*, v. 8, no. 43, Jan. 1953, p. 1273-1279.

Behavior is due either to heat action or to electron current action. Though difficult, these two actions are separated and effects of current and cathode temperature are discussed. Tables, graphs. 7 ref. (P15)

293-P. (German.) **Change of Electrical Resistance by Cold Deformation.** Hermann Weyerer. *Zeitschrift für Metallkunde*, v. 44, no. 2, Feb. 1953, p. 51-58.

Minimum resistance, whose exact form depends on degree of purity and atmosphere of heating, was found for hard drawn wire and brass wires. This resistance was found to be related to the heating temperature of the metal. (P15, Cu, Fe, Al)

294-P. (German.) **Field Electronic Emission and Work Function of Individual Crystalline Surfaces.** M. Drechsler and E. W. Müller. *Zeitschrift für Physik,* v. 134, no. 2, 1953, p. 208-221.

Formulas are derived for field emission current densities of individual surfaces and total current of metallic surfaces. Diagrams, graphs, tables. (P15)

295-P. The Two-Dimensional Magnetic or Electric Field Above and Below an Infinite Corrugated Sheet. N. H. Langton and N. Davy. *British Journal of Applied Physics,* v. 4, May 1953, p. 134-137.

Field is investigated on the sheet which is regarded as a magnetized ferromagnetic body. Method involves use of conformal transformations and elliptic integrals. Tables, diagrams. (P16)

296-P. Chemistry in Iron & Steel Research. *Chemical Age,* v. 68, May 9, 1953, p. 695-700.

Reviews work with physical chemistry, refractories, and corrosion. (P13, R general, Fe, ST, EG-d)

297-P. Measurements on Superconductivity in Thin Tin Films. A. Van Itterbeek, L. De Greve, L. Van Gerven, and J. Schepers. *Nature,* v. 171, May 9, 1953, p. 834.

Describes measurements under influence of a magnetic field and under combined action of the current and a magnetic field. (P15, Sn)

298-P. Kramer and Russell Effects With Single Crystals of Zinc. L. Grunberg and K. H. R. Wright. *Nature,* v. 171, May 16, 1953, p. 890.

Experiment which showed that abrasion of metals causes formation of sites of low work function. (P15, M26, Zn)

299-P. Observations on Slip Found in a Diamond. S. Tolansky and M. Omar. *Philosophical Magazine,* v. 44, May 1953, p. 514-518.

Interferometric and optical studies on a twinned diamond reveal the presence of true crystallographic slip on two opposite faces of the twin. Internal optical opacity is found associated with the slip. (P17, C)

300-P. On the Existence of Multiple Resonances in the Cu (γ,n)^{62} Cu Reaction. K. Phillips. *Philosophical Magazine,* v. 44, May 1953, p. 533-541.

Accurate control of the energy of a 20 Mev betatron shows that the activation-energy curve consists of a series of small plateaus indicating the existence of narrow resonances for the photo-neutron reaction in Cu. 13 ref. (P13, M25, Cu)

301-P. (German.) **Electrical Behavior of Thin, Metallic Coatings.** A. Schulze and H. Eicke. *Metall,* v. 7, no. 5-6, Mar. 1953, p. 171-182.

Presents studies of electrical resistance and temperature coefficients for layers of various metals. Differences in behavior are enumerated. Graphs, tables. 25 ref. (P15)

302-P. (German.) **Highly Permeable Alloys in the System NiFeCuMo.** F. Assmus and F. Pfeifer. *Metall,* v. 7, no. 5-6, Mar. 1953, p. 189-191.

Study of a series of Cu-containing permalloy alloys from 300-600° C. Influence of tempering on magnetic properties. Graphs. 8 ref. (P16, Ni, EG-n)

303-P. (German.) **Development and Present State of Permanent Magnet Materials.** Walter Dannöhl. *Stahl und Eisen,* v. 73, no. 2, Jan. 15, 1953, p. 65-81.

Classification methods yielding permanent magnet properties. Permanent magnet materials used in Germany and abroad. Theory of coercive force; demagnetization curve; and ring and tip formation of the so-called "Weiss" zones. (P16, SG-n)

304-P. (German.) **Electrochemical Behavior of Fe-Cr Alloys in KNO_3 and Dilute HNO_3.** Th. Neumann and W. Rösener. *Zeitschrift für Elektrochemie; Berichte der Bunsengesellschaft für physikalische Chemie,* v. 57, no. 1, 1953, p. 17-22.

Alloys with up to 17% Cr remained in the solid state and evolved O_2 when placed in KNO_3 at a sufficiently high potential. Alloys of higher Cr content were dissolved without O_2 evolution. (P15, AY)

305-P. (German.) **Spectral-Analytical Research on PbS With Regard to Photo-Electric and Thermo- and Rectifier Effects.** J. E. Hiller and H. G. Smolczyk. *Zeitschrift für Eleckrochemie; Berichte der Bunsengesellschaft für physikalische Chemie,* v. 57, no. 1, 1953, p. 50-58.

Fifty-seven PbS samples of varying origin and formation were tested. Relationships of these effects were compared with results of spectral and X-ray research. (P15)

306-P. (German.) **Catalytic Activity of Nickel and Cobalt and Its Dependence on Hydrogenation Temperature.** F. Lihl and P. Zemsch. *Zeitschrift für Elektrochemie; Berichte der Bunsengesellschaft für physikalische Chemie,* v. 57, no. 1, 1953, p. 58-69.

Extent to which relationships can be described by Arrhenius equation. (P13, Ni, Co)

307-P. The Adsorption of Gases at High Saturations. I. The Adsorption of Nitrogen, Argon, and Oxygen. II. The Thickness of the Unsaturated Helium Film. Raymond Bowers. *Philosophical Magazine,* v. 44, May 1953, p. 467-496.

Adsorption of A, N_2, and O_2 on an Al foil determined by gravimetric method. Data obtained at high saturations compared with equation describing multilayer adsorption. Adsorption of He on an Al foil measured between 1.8° K and 4.2° K. Values for the unsaturated film compared with existing data for the thickness of the saturated helium II film. Graphs. 48 ref. (P13, S11, Al, EG-m,p)

308-P. (Book—German.) **(Magnetic Measurements of Ferromagnetic Materials.) Magnetische Messungenan Ferromagnetischen Stoffen.** Werner Jellinghaus. 163 pages. 1952. Walter de Gruyter & Co., Berlin. W. 35, Germany.

Includes systems of measurement, magnetic field generation, processes for determining points of hysteresis loop, magnetostriction, screening, and temperature influence. (P16)

309-P. (Book.) **Metallurgical Thermochemistry.** O. Kubaschewski and E. Ll. Evans. 368 p. 1951. Academic Press, 125 E. 23rd St., New York 10, N. Y. $6.00.

Theoretical basis, experimental methods, estimation of thermochemical data, tabulation of data, and examples of thermochemical treatment of metallurgical problems. (P12)

Q

MECHANICAL PROPERTIES AND TEST METHODS; DEFORMATION

393-Q. Stress Waves in Solids. R. M. Davies. *Applied Mechanics Reviews,* v. 6, Jan. 1953, p. 1-3.

Presents review of work done on stress waves. 99 ref. (Q25)

394-Q. Evaluation of Stresses in a Circular Ring by the Relaxation Method. Y. V. G. Acharya, L. S. Srinath, and C. N. Lakshminarayana. *Applied Scientific Research,* sec. A, v. 3, no. 6, 1953, p. 415-428.

Method which is partly experimental and theoretical. Photographs and diagrams. (Q25)

395-Q. Axial Tension and Bending Interaction Curves for Members Loaded Inelastically. D. O. Brush and O. M. Sidebottom. *ASME, Transactions,* v. 75, Jan. 1953, p. 63-71; disc., 71-72.

Presents a theoretical method for constructing dimensionless interaction curves for members subjected to combined tension and bending loads that produce inelastic strains, as well as experimental results which verify the theory. Diagrams and graphs. (Q23, Al, Cn)

396-Q. Influence of Residual Stress on Behavior of Thick-Wall Closed-End Cylinders. J. H. Faupel and A. R. Furbeck. *ASME, Transactions,* v. 75, Apr. 1953, p. 345-354.

Results obtained from macro residual-stress, internal-pressure, and mechanical-property tests on Cr-Ni-Mo-V steel, SAE 3320, and SAE 1045 steel cylinders. Tables and graphs. (Q25, AY, CN)

397-Q. Full-Scale Fatigue Testing of Compressor Cylinders. T. O. Kuivinen. *ASME, Transactions,* v. 75, Apr. 1953, p. 467-471, disc., p. 471-472.

Investigation carried out in fatigue-testing compressor cylinder design. Photographs, graphs, and diagrams. (Q7, CI)

398-Q. The Influence of Aging on the Bauschinger Effect in Inelastically Strained Beams. T. M. Elsesser, O. M. Sidebottom, and H. T. Corten. *ASME, Transactions,* v. 74, Nov. 1952, p. 1291-1296.

Tests were conducted on beams of rectangular cross section made from annealed mild (SAE 1020) and high-carbon (rail) steels. Diagrams and graphs. (Q24, CN)

399-Q. The Effect of Slightly Elevated-Temperature Treatment Upon Microscopic and Submicroscopic Residual Stresses Induced by Small Inelastic Strains in Metals. H. T. Corten and T. M. Elsesser. *ASME, Transactions,* v. 74, Nov. 1952, p. 1297-1302.

Investigation using brass and low-carbon steel. Graphs. 21 ref. (Q25, Cu, CN)

400-Q. Failure of High-Pressure Fuel Pipes. *Engineer,* v. 195, May 1, 1953, p. 628-630.

Investigation to establish the cause of failures occurring in fuel pipelines. Pipes were commonly subjected to resonant vibrations and suffered fatigue fractures. Presents solution. Diagrams and tables. (Q7, SS, CN, Ni-d)

401-Q. Low Load Hardness Tester With a Load Range From 100 to 1000 Grammes. *Industrial Diamond Review,* v. 13, Apr. 1953, p. 84-85.

A hardness tester which fills a gap between existing micro and

macro-hardness testers. Can determine hardness of materials down to 0.1 mm. thick. Photograph and table. (Q29)

402-Q. Nickel Restrictions Bring Use of New Stainless Steels. R. A. Lincoln. *Iron Age,* v. 171, May 14, 1953, p. 129-132.

Development of possible Cr-Mn alternates to 18-8 Types 301, 302, and 304. Mechanical and corrosion resistance properties.
(Q general, R general, SS)

403-Q. Notes on the Plastic Critical Temperature in Strain-Induced Martensite Reactions. C. Dean Starr. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 654.

True stress-strain curves were obtained for a series of Type 304 stainless steel specimens from 67 to 300° K. Graphs. (Q23, SS)

404-Q. Simple Devices for Approximating Constant Stress During Tensile Creep Tests. R. L. Fullman, R. P. Carreker, Jr., and J. C. Fisher. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 657-659.

Shows that proper choice of dimensions of a simple loading beam permits maintenance of nearly constant stress during creep testing of polycrystalline materials or resolved shear stress during creep testing of single crystals. (Q3)

405-Q. Deformation of Ferrite Single Crystals. F. L. Vogel, Jr. and R. M. Brick. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 700-706.

Reviews previous work and describes experimental procedure. Determination of glide plane, temperature dependence of resistance to shear, yield point, and twinning. Micrographs and graphs. (Q24, Fe)

406-Q. Metallographic Observations of the Deformation of High-Purity Magnesium in Creep at 500° F. A. R. Chaudhuri, N. J. Grant, and J. T. Norton. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 712-716.

Pictorial and qualitative account of the changes that high-purity Mg undergoes during creep at 500° F. 13 ref. (Q3, Mg)

407-Q. On the Propagation of Waves in Isotropic Incompressible Perfectly Elastic Materials. J. L. Ericksen. *Journal of Rational Mechanics and Analysis,* v. 2, Apr. 1953, p. 329-337.

Presents a theoretical analysis. (Q21)

408-Q. Singular Surfaces and Flow Lines in the Theory of Plasticity. T. Y. Thomas. *Journal of Rational Mechanics and Analysis,* v. 2, Apr. 1953, p. 339-381.

Deals with slip surfaces in the plastic region which result from simple tension and compression tests. (Q23)

409-Q. The Effect of Compressibility on the Inclination of Plastic Slip Bands in Flat Bars. T. Y. Thomas. *National Academy of Sciences, Proceedings,* v. 39, Apr. 1953, p. 266-273.

Discusses the classical elasticity theory which relates divergence of the displacement vector and mean stress. (Q24)

410-Q. On the Inclination of Plastic Slip Bands in Flat Bars in Tension Tests. T. Y. Thomas. *National Academy of Sciences, Proceedings,* v. 39, Apr. 1953, p. 257-265.

Applies Hencky stress-strain relations for small plastic displacements to problem of determining inclination of plastic slip bands which develop in an ideal flat bar subjected to tension. (Q27)

411-Q. Viscous Flow. A. V. Brancker. *Petroleum,* v. 16, May 1953, p. 119-124.

Discusses the anomalies encountered in viscous flow, particularly in the extrusion of non-Newtonian materials. Stress-time, strain-time concept is briefly considered. Graphs and diagrams. 25 ref. (Q24)

412-Q. (French.) **Measures of Local Deformation and Calculation of Welding Stresses on Both Faces of Bottom Plates of Two Ships in Construction on Ways.** R. Spronck and J. J. L. van Maanen. *Revue Soudure,* v. 8, no. 4, 1952, p. 214-232.

Diagrams. Photographs.
(Q25, K9, CN)

413-Q. (German.) **Hardness Measurement of Silver Surfaces.** Albert Keil. *Metalloberfläche,* v. 7, no. 4, Apr. 1953, p. A58-A60.

Discusses unexplained changes of Vicker microhardness values with different loads. Deviations are caused by minute surface variations arising during treatment or alloy separations at an unpolished surface. Graphs. 7 ref. (Q29, Ag)

414-Q. Mechanical Anisotropy in Some Ductile Metals. W. A. Backofen and B. B. Hundy. *Institute of Metals, Journal,* v. 81, May 1953, p. 433-438.

Fracturing test specimens in tension after prestraining in torsion shows that a fibrous crack-like structure, causing a considerable degree of mechanical anisotropy, exists in 70:30 brass, Ni, Monel metal, Armco iron, and high-purity Al. Commercially pure Al samples did not show this effect. Graphs. 14 ref.
(Q27, Cu, Ni, Al, Fe)

415-Q. A Note on the Mathematical Analysis of Creep Curves. L. M. T. Hopkin. *Institute of Metals, Journal,* v. 81, May 1953, p. 443-448.

Comparison is made between Andrade and logarithmic equations to determine their relative accuracies in fitting the experimental results from tests of relatively long duration. Effects of grain size and stress on creep behaviour were compared with constants obtained by analyzing the creep curves using the Andrade equation. Graphs, tables. 12 ref. (Q3)

416-Q. Deflection and Stresses in Beams Subjected to Bending and Creep. Yoh-Han Pao and Joseph Marin. *Journal of Applied Mechanics,* v. 19, Dec. 1952; *American Society of Mechanical Engineers, Transactions,* v. 74, p. 478-484.

Presents theories which are based on a creep-stress-time relation in simple tension which gives an accurate fit of most test data. Comparison between actual creep deflections for Plexiglas specimens subjected to pure bending and values predicted by the proposed theory shows good agreement between experimental and theoretical results. Application of the theory to the determination of deflections in various kinds of beams. Graphs.
(Q3, Q5)

417-Q. Determination of Theoretical Plastic Stress-Strain Relations for Variable Combined Stress Ratios. L. W. Hu and Joseph Marin. *Journal of Applied Mechanics,* v. 19, Dec. 1952; *American Society of Mechanical Engineers, Transactions,* v. 74, p. 485-488.

Presents analytical procedure for the determination of theoretical stress-strain relations. Applications show how it can be used. Graphs. (Q23)

418-Q. A Simple Method of Determining Plastic Stresses and Strains in Rotating Disks With Nonuniform Metal Properties. M. H. Lee Wu. *Journal of Applied Mechanics,* v. 19, Dec. 1952; *American Society of Mechanical Engineers, Transactions,* v. 74, p. 489-495.

Method of solving plastic deformation of a rotating disk having nonuniform metal properties. Graphs. 9 ref. (Q24)

419-Q. Combined Tension-Torsion Tests for Aluminum Alloy 2S-O. Aris Phillips. *Journal of Applied Mechanics,* v. 19, Dec. 1952; *American Society of Mechanical Engineers, Transactions,* v. 74, p. 496-500.

Ten combined tension-torsion tests with thin-walled circular tubes show that the theory of plastic flow represents experimental results with much greater accuracy than does theory of plastic deformation. Graphs, photographs. (Q24, Al)

420-Q. On Longitudinal Plane Waves of Elastic-Plastic Strain in Solids. D. S. Wood. *Journal of Applied Mechanics,* v. 19, Dec. 1952; *American Society of Mechanical Engineers, Transactions,* v. 74, p. 521-525.

Theoretical description for the propagation of longitudinal plane waves of large lateral extent in solids, for waves of plastic as well as elastic strain. Importance of hydrostatic compressibility in determining nature of the waves. Results are illustrated by computation of propagation velocities of such waves in 24S-T Al alloy, and by a computation of the propagation of a pressure pulse of short duration through a flat plate. Graphs. 10 ref. (Q23, Al)

421-Q. Torsion of Uniform Rods With Particular Reference to Rods of Triangular Cross Section. Henry Nuttall. *Journal of Applied Mechanics,* v. 19, Dec. 1952; *American Society of Mechanical Engineers, Transactions,* v. 74, p. 554-557.

Variational approach to the solution of the Saint-Venant torsion problem. Use is made of the hydrodynamic analogy to extend application of solutions to the problem of flow of a viscous incompressible fluid in a tube of triangular section. (Q1)

422-Q. Stress-Concentration Factors for Single Notch in Flat Bar in Pure and Central Bending. M. M. Leven and M. M. Frocht. *Journal of Applied Mechanics,* v. 19, Dec. 1952; *American Society of Mechanical Engineers, Transactions,* v. 74, p. 560-561.

Investigation of factors. Graphs. (Q5)

423-Q. Some Problems of Orthotropic Plane Stress. H. D. Conway. *Journal of Applied Mechanics,* v. 20, Mar. 1953; *American Society of Mechanical Engineers, Transactions,* v. 75, p. 72-76.

Shows how many solutions for problems in isotropic elasticity can be extended to the case where the material is orthotropic. 13 ref. (Q25)

424-Q. The Stress Distributions Induced by Concentrated Loads Acting in Isotropic and Orthotropic Half Planes. H. D. Conway. *Journal of Applied Mechanics,* v. 20, Mar. 1953; *American Society of Mechanical Engineers, Transactions,* v. 75, p. 82-86.

Use of the Fourier integral method to solve the problem of the half plane subjected to a concentrated load acting at some finite distance from the straight edge. Results are extended to include the more general problem of the orthotropic half plane. (Q25)

425-Q. Nonlinear Distribution of Bending Stresses Due to Distortion of the Cross Section. H. H. Bleich, *Journal of Applied Mechanics,* v. 20, Mar. 1953; *American Society of Mechanical Engineers, Transactions,* v. 75, p. 95-104.

Theory to explain nonlinear distribution found in recent tests on a passenger ship with long superstructure, and in model tests. Case of constant cross section of the beams is treated. Solutions in qualitative agreement with the tests are obtained for two types of loading. Diagrams. (Q5)

426-Q. The Necking and the Rupture of Rods Subjected to Constant Tensile Loads. N. J. Hoff. *Journal of Applied Mechanics,* v. 20, Mar. 1953; *Society of Mechanical Engineers, Transactions,* v. 75, p. 105-108.

One-dimensional theory of the behavior of a nonlinear visco-elastic bar subjected to a constant tensile load is developed with the aid of a creep law considering secondary creep alone. Theoretical value of the time at which the bar ruptures and the shape calculated for the necked portion of the bar are in satisfactory agreement with the results of experiments. Graphs. (Q27, Q3)

427-Q. Elastic Waves Created During Tensile Fracture. Julius Miklowitz. *Journal of Applied Mechanics,* v. 20, Mar. 1953; *American Society of Mechanical Engineers, Transactions,* v. 75, p. 122-130.

Phenomenon of the second fracture. Analytical and experimental work carried out on elastic strain waves. Methods of operational mathematics and electric-analog computer were employed in the analytical study. Diagrams. 12 ref. (Q26)

428-Q. Mechanically Mounted Cutting Elements of Cemented Carbide. W. L. Kennicott. *Mechanical Engineering,* v. 75, May 1953, p. 387-392.

Mechanical properties of cutting-tool carbides and effect of properties on design. Mechanically clamped, prismatic-type, and indexable inserts. Diagrams, photographs. (Q general, G17, TS, C-n)

429-Q. Tangential Forces in Wire Ropes. Frederico Hruska H. Madeco. *Wire and Wire Products,* v. 28, May 1953, p. 455-460.

Shows how the driving moments under known conditions and the changes in the distribution of stresses in ropes caused by rotation can be calculated. (Q25)

430-Q. (French.) **Analogical Electrical Model for the Study of the Bending of Beams.** L. Malavard and J. Boscher. *Comptes Rendus hebdomadaries des Séances de l'Académie des Sciences.* vol. 236, no. 11, Mar. 16, 1953, p. 1130-1133.

Practical determination is not difficult, but the above model is very desirable for problems introducing parameters such as load changes; moments of inertia; and the place, nature, and number of supports. Graph. (Q5)

431-Q. (French.) **Group for the Advancement of Methods of Analyzing Stresses. Measuring Internal Stresses by X-Ray.** A. Guinier. *Métaux Corrosion—Industries,* v. 28, no. 329, Jan. 1953, p. 1-7.

Possibilities and techniques. Diagrams. 6 ref. (Q25)

432-Q. (French.) **Unique Applications of Wire Strain Gauges.** F. Flusin. *Métaux Corrosion—Industries,* v. 28, no. 329, Jan. 1953, p. 8-11.

Reviews experiences with above under oil and water and at high temperatures at Laboratoire du Centre Technique de l'Aluminium. Graph, diagrams. (Q25, Al)

433-Q. (French.) **Wear Tests on Cutting and Stamping Steels.** Hans Bühler. *Métaux Corrosion—Industries,* v. 28, no. 329, Jan. 1953, p. 36-42.

Results of examination of 35 different steels. Graphs, diagram, tables. 6 ref. (Q9, TS)

434-Q. (German.) **The Endurance Limit of Welded Al Alloys.** A. Müller-Busse. *Aluminium,* v. 29, no. 3, Mar. 1953, p. 102-105.

Investigates the limits of connections on AlCuMg, AlMg, and AlMgSi alloys. Resistance to bending stress is higher in gas welded connections. (Q7, K2, Al)

435-Q. (German.) **Determination of Elastic Stresses and Plastic Deformations by the X-Ray Back Reflection Process.** Otto Vaupel. *Kolloid Zeitschrift,* v. 129, no. 2-3, Dec. 1952, p. 92-95.

Absolute stress values at a given point can be determined by photo-elasticity for transparent bodies and by X-ray back reflection for crystalline substances. Biaxial stresses can be determined by X-ray reflection. Diagrams. (Q25)

436-Q. (German.) **Dependence of Hardness on Test Load.** Wilhelm Späth. *Metalloberfläche,* v. 7, ser. A, no. 3, Mar. 1953, p. A38-A40.

Presents a brief theoretical derivation. (Q29)

437-Q. (German.) **Choice of Steels Suitable for Austempering.** Erich Theis. *Stahl und Eisen,* v. 73, no. 6, Mar. 12, 1953, p. 347-360.

Hardness and notched-bar impact tests on 175 plain C steels and others containing Si, Mn, Cr, V, and/or Ti. Graphs. (Q5, Q29, Q26, CN, AY)

438-Q. (Italian.) **Hooke's Law and the Limits of the Field of Elasticity. Static and Fatigue Limit.** A. Kammerer. *Metallurgia Italiana,* v. 45, no. 2, Feb. 1953, p. 41-46.

Principal mechanical properties of materials can be found by computing general equations of the theory of elasticity. (Q21)

439-Q. (Italian.) **Relaxation and Cold Creep of Steels for Pre-Compressed Structures.** Francesco Merlino. *Metallurgia Italiana,* v. 45, no. 2, Feb. 1953, p. 47-51.

Reviews methods and research results of European laboratories. (Q3)

440-Q. Metals for Extreme Temperatures. Morgan M. Hoover. *Chemical Engineering,* v. 60, June 1953, p. 212-215.

Various factors in selection of metals for high and low temperatures. Graphs. 6 ref. (Q general, CN, AY)

441-Q. Creep Tests on Nimonic Alloys Under Varying Stress and Temperature. D. C. Herbert and D. J. Armstrong. *Engineering,* v. 175, May 8, 1953, p. 605-606.

Results of creep tests on two typical gas-turbine blade materials under cyclic changes of stress and temperature. Graphs. (Q3, Ni)

442-Q. Internal Stress in Castings, M. M. Hallett, chairman, *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. A179-A185; disc., p. A185-A189.

Origins of internal stresses. Experimental work carried out on brass double-flange bars, Al grid castings, and gray iron hollow cylinders. Diagrams. (Q25, E general, Cu, Al, CI)

443-Q. Stability of Thin Elastic Plates Covering an Arbitrary Simply Connected Region and Subject to Any Admissible Boundary Conditions. G. A. Zizicas. *Journal of Applied Mechanics,* v. 20, Mar. 1953; *American Society of Mechanical Engineers Transactions,* v. 75, p. 23-29.

Bergman method of solving boundary-value problems by means of particular solutions of the differential equation, which are constructed without reference to the boundary conditions, is applied to problem of stability of thin elastic plates. A direct method is presented for construction of particular solutions that is applicable to both anisotropic and isotropic plates. 39 ref. (Q21)

444-Q. The New Approach to Shell Theory. Circular Cylinders. E. H. Kennard. *Journal of Applied Mechanics,* v. 20, Mar. 1953; *American Society of Mechanical Engineers, Transactions,* v. 75, p. 33-40.

Presents expressions for the distributions of stress and displacements from which stress resultants are calculated. (Q25)

445-Q. Effect of Surface Condition on Creep of Some Commercial Metals. E. D. Sweetland and E. R. Parker. *Journal of Applied Mechanics,* v. 20, Mar. 1953; *American Society of Mechanical Engineers, Transactions,* v. 75, p. 30-32.

Relative creep rate of specimens of 2S Al and commercial drawn Cu were investigated with the oxide surface layers removed and, under the same conditions, after the oxide was permitted to form. (Q3, Al, Cu)

446-Q. A Nondestructive Differential-Pressure Test for Thin Shells. J. C. New. *Journal of Applied Mechanics,* v. 20, Mar. 1953; *American Society of Mechanical Engineers, Transactions,* v. 75, p. 48-52.

Nondestructive, experimental technique for determining incipient buckling pressures of thin shells subjected to external pressure. Applications and limitations of the test. Graphs. (Q23, Al, CN)

447-Q. Movies of Stress Waves in Photoelastic Rubber. H. C. Perkins. *Journal of Applied Mechanics,* v. 20, Mar. 1953; *American Society of Mechanical Engineers, Transactions,* v. 75, p. 140-141.

Successful recording on movie film of stress-wave patterns in gelatin and photo-elastic rubber; advocates use of rubber for photo-elastic studies of impact stress. (Q25)

448-Q. The Effect of Pressure on the Tensile Properties of Several Metals and Other Materials. P. W. Bridgman. *Journal of Applied Physics,* v. 24, May 1953, p. 560-570.

Results of tension tests to fracture materials under superposed hydrostatic pressure. Photographs, graphs. (Q25, Ni, Ta, Cb, Mo, W)

449-Q. Internal Friction and Young's Modulus of Cold-Worked Copper Single Crystals. J. Weertman and J. S. Koehler. *Journal of Applied Physics,* v. 24, May 1953, p. 624-631.

Investigates the behavior of internal friction with respect to cold work. Diagrams, graphs. 13 ref. (Q21, Cu)

450-Q. Effect of Internal Strains on Linear Expansion, X-Ray Lattice Constant, and Density of Crystals. Chester R. Berry. *Journal of Applied Physics,* v. 24, May 1953, p. 658-659.

Gives α the value of 1 instead of 2 in the measurements of density and lattice constant of Ag with Zn impurity. 7 ref. (Q25, P10, Ag, Zn)

451-Q. Zirconium. Its Use in Magnesium Alloys. A. E. Williams. *Mining Magazine,* v. 88, May 1953, p. 273-276.

Grain-refining effect of Zr on Mg. Alloy properties are described. Micrographs. (Q general, M27, Zr, Mg)

452-Q. Testing of Bearing Properties of Metals. D. Tabor. *Nature*, v. 171, May 9, 1953, p. 827.

Methods for testing bearing wear under actual conditions. (Q9)

453-Q. The Effect of Small Amounts of Cold-Work on Young's Modulus of Copper. A. D. N. Smith. *Philosophical Magazine*, v. 44, May 1953, p. 453-466.

Investigation of effect of plastic extension and subsequent low-temperature annealing. Shows there is a reduction of about 11% in the modulus, the greater part of which is recoverable after prolonged annealing at 100° C. Graphs. 11 ref. (Q21, Q24, Cu)

454-Q. Fatigue Testing. Its Machines and Methods. T. R. Breunich. *Product Engineering*, v. 24, Feb. 1953, p. 128-134; Mar. 1953, p. 148-154.

Types and operating principles of some typical single-purpose and universal testing machines. Part 2 includes the resonant machine, semi-special machines, and vibration generators. Diagrams, photographs, and tables. (Q7)

455-Q. Corrugating Roll Life. A. W. Werner. *Tappi*, v. 36, May 1953, p. 171A-175A.

Factors causing wear of chromium-plated corrugating rolls. (Q9, Cr)

456-Q. The Mechanics of Notch Brittle Fracture. A. A. Wells. *Welding Research*, v. 7, Apr. 1953, p. 34r-56r.

A complete report of work carried out to study a new approach to the subject. Tables, photographs, diagrams. 51 ref. (Q23, CN, AY)

457-Q. (French.) **Study of Wear Surfaces With an Electron Microscope.** K. Ogawa and N. Takahashi. *Metaux Corrosion-Industries*, v. 28, no. 330, Feb. 1953, p. 69-74.

Graphs, micrographs. 4 ref. (Q9, M21)

458-Q. (French.) **Problems of the Strength of Light-Alloy, Heat-Propelled Vanes.** A. Renard. *Metaux Corrosion-Industries*, v. 28, no. 330, Feb. 1953, p. 79-81.

Problems encountered in jet propulsion of helicopter blades. Tests were made at 150° C. (Q23, T24, Al)

459-Q. (French.) **Influence of Addition Elements on the High-Temperature Behavior of Magnesium Alloys.** Jean Gris. *Metaux Corrosion-Industries*, v. 28, no. 330, Feb. 1953, p. 87.

Tables. 3 ref. (Q general, B22, Mg)

460-Q. (German.) **Influence of Various Factors on Earing of Al Sheets.** G. Siebel and H. Hug. *Aluminium*, v. 29, no. 1-2, Jan.-Feb. 1953, p. 51-58.

Texture of hot rolled sheet from continuous and die cast ingots causes forming of ears. Influences of rolling at 600° C and degree of cold deformation after rolling are discussed. Photographs, graphs. 5 ref. (Q24, F23, Al)

461-Q. (German.) **Determining Tendency Toward Brittle-Fracture of Structural Steels in Notched-Tensile and Notched-Tensile-Impact Tests.** Otto Lisner. *Archiv für das Eisenhüttenwesen*, v. 24, no. 1-2, Jan.-Feb. 1953, p. 27-42.

Kuntze test was applied to 130 weldable unalloyed steels. Analytical results of relationship between deformation velocity and brittle-fracture. Graphs, tables. 32 ref. (Q26, Q27)

462-Q. (German.) **Conclusions and Results From Sound Measurement in the Tensile Stress of Metals.** Josef Kaiser. *Archiv für das Eisenhüttenwesen*, v. 24, no. 1-2, Jan.-Feb. 1953, p. 43-45.

Hardness and deformation character were studied by means of new electro-acoustic amplifying device. Hardness values, height of internal stresses, and effect of peripheral zone determine a characteristic curve for each substance. Graphs. 8 ref. (Q23, Al, Cu)

463-Q. (German.) **Influence of Alloy Components on Mechanical Properties of Steel.** Hubert Juretzek, Alfred Krisch, and Werner Trommer. *Archiv für das Eisenhüttenwesen*, v. 24, no. 1-2, Jan.-Feb. 1953, p. 69-82.

283 melts were made in a 20-kg. high-frequency furnace. The compositions included one to four alloying elements. Graphs, tables. 51 ref. (Q general, AY)

464-Q. (German.) **Correlation Between Chemical Composition and Notched-Bar Impact Strength After Aging of Rimmed Steels.** Helmut Knüppel and Karl Mayer. *Stahl und Eisen*, v. 73, no. 7, Mar. 26, 1953, p. 401-410.

Tests at various temperatures on 16-mm. bars. Check tests were carried out on openhearth and Bessemer steels. Graphs, tables. (Q6, N7, CN)

465-Q. (German.) **Plastic Deformation of Ge at Higher Temperatures.** Ludwig Graf, Hans-Reiner Lacour, and Karl Seiler. *Zeitschrift für Metallkunde*, v. 44, no. 3, Mar. 1953, p. 113-114.

Effect of heating and quenching on electrical resistance was decreased by plastic deformation. Slip bands appearing above 600° C indicated a lattice transformation. Photographs. 3 ref. (Q24, P15, M26, Ge)

466-Q. (German.) **Hardness.** Heribert Moser. *Zeitschrift für Metallkunde*, v. 44, no. 2, Feb. 1953, p. 43-50.

Experiments using the Kapper method were made on various metallic materials. A characteristic material constant for plastic properties was found. (Q29)

467-Q. (Russian.) **Some Suggestions Concerning Rigidity and Noncurvability.** N. V. Efimov. *Uspekhi Matematicheskikh Nauk*, v. 7, no. 5(51), Sept.-Oct. 1952, p. 215-224.

Basic considerations of the theory. Additional conditions formulated and proved. Concludes that a spherical segment does not permit analytical slide curves. (Q23)

468-Q. (Book.) **Advanced Strength of Materials.** J. P. Den Hartog. 379 p. 1952. McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y. $8.50.

Covers torsion, rotating disks, membrane stresses in shells, bending of flat plates, beams on elastic foundation, two-dimensional theory of elasticity, the energy method, buckling, and miscellaneous topics. (Q23)

469-Q. (Book.) **History of Strength of Materials.** Stephen P. Timoshenko. 452 p. 1953. McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y.

Historical development of the science in chronological order from its beginnings to the present. Major contributions by prominent scientists and engineers. (Q23)

R

CORROSION

187-R. In Plant Maintenance Corrosion Poses a Major Problem. R. C. Thiede. *Canadian Metals*, v. 16, May 1953, p. 43-44.

Discusses some of the problems met by the maintenance and repair section of a chemical plant. (R29, Pb)

188-R. Passivity of Metals. Part XII. Intense Attack at the Water-Line of Otherwise Passive Metal. A. M. Peers and U. R. Evans. *Chemical Society, Journal*, Apr. 1953, p. 1093-1102.

Water-line attack on iron partly immersed in NaCl solution containing phosphate, carbonate or other anodic inhibitor was studied in presence of O_2 without applied current and in absence of O_2 with applied anodic current. Graphs, diagrams. (R10, Fe)

189-R. Caustic Cracking in Steam Boilers. A. A. Berk. *Chemistry and Industry*, Apr. 18, 1953, p. 360-364.

Discusses a number of factors which aid in the prevention of caustic cracking. Tables. (R4, CN)

190-R. The Influence of Potassium Dichromate on Stainless Steel in Deaerated Sulphuric Acid. I. D. G. Berwick. *Chemistry and Industry*, Apr. 25, 1953, p. 408-409.

Briefly reports experiments. (R5, SS)

191-R. Scale vs. Bare Steel Potential Differences May Explain Unusual Tank Vessel Corrosion. L. M. Mosher. *Corrosion* (News Section), v. 9, May 1953, p. 1-2.

Factors which are significant in determining cause of corrosion. (R1, CN)

192-R. Hydrogen Blistering of Steel in Hydrogen Sulfide Solutions. T. Skei, A. Wachter, W. A. Bonner, and H. D. Burnham. *Corrosion*, (Technical Section), v. 9, May 1953, p. 163-172.

Laboratory investigations were made of relative influence of environmental factors on the rate and extent of H_2 transmission through carbon steel. Studies include determination of effects of concentration of important constituents such as H_2S, low molecular weight organic acids, NH_3, and HCN. Photographs and graphs. (R11, CN)

193-R. A Laboratory Method for Screening Oil Well Corrosion Inhibitors. J. A. Caldwell and M. L. Lytle. *Corrosion (Technical Section)*, v. 9, May 1953, p. 186-187.

Describes a weight-loss test in which accurately weighed mild steel coupons are exposed to corrosive fluids from wells producing sour crude oil. Diagrams. (R11, CN)

194-R. The Inhibition of the Corrosion of Iron by Some Anodic Inhibitors. M. J. Pryor and M. Cohen. *Electrochemical Society, Journal*, v. 100, May 1953, p. 203-215.

Study to determine whether one mechanism of inhibition could be advanced to explain the passivation of Fe by anodic inhibitors in general, since their behavior toward Fe was similar. Inhibitors investigated were Na acetate, benzoate, silicate, carbonate, tungstate, molybdate, chromate, nitrite, hydroxide, and phosphate. Experiments were carried out to ascertain whether inhibitors that were extremely effective

in distilled water were effective in solutions containing KCl. Effect of CO_2 on the corrosion rate was also determined. 20 ref. (R10, Fe)

195-R. Amount of Oxygen on the Surface of Passive Stainless Steel. Herbert H. Uhlig and Samuel S. Lord, Jr. *Electrochemical Society, Journal,* v. 100, May 1953, p. 216-221.

Amount of O_2 on the surface of 18-8 stainless steel was obtained by pickling the alloy with HCl-H_2SO_4, washing with N_2-saturated water, and then exposing the metal to water of known dissolved O_2 content. Tables and graphs. 21 ref. (R10, SS)

196-R. Corrosion of Fuel-Injection Nozzles. W. P. Mansfield. *Engineering,* v. 175, May 1, 1953, p. 564-566.

Investigation of the cause of corrosion. Shows that it could be eliminated by a suitable increase in nozzle temperature. Photographs. (R7)

197-R. The Effect of Water Properties. *Gas Times,* v. 75, May 1, 1953, p. 147-148, 150, 153.

Extracts from "Water Properties and Their Effect Upon Some Water Heating Appliances" by Philip Lang. Effect of softening, synthetic detergents, scale reducers, corrosion, and electrolytic inhibitors. (R4)

198-R. Corrosion Resistance of Titanium, Zirconium, and Stainless Steel in Organic Compounds. I. R. Lane, Jr., L. B. Golden, and W. L. Acherman. *Industrial and Engineering Chemistry,* v. 45, May 1953, p. 1067-1070.

Results obtained with Ti, Zr, and stainless steel exposed to the corrosive action of various anhydrous and aqueous solutions of organic compounds at several temperatures. Tables. 12 ref. (R5, Ti, Zr, SS)

199-R. Evaluation of Bearing Packages. Wells E. Ellis, O. L. Maag, and M. J. Benach. *Modern Packaging,* v. 26, May 1953, p. 127-132, 190, 193.

Data from outdoor storage tests and laboratory accelerated tests of polyethylene containers, plastic strippable compounds, and rigid metal containers of the food-can type. Photographs, tables. (R3, T10)

200-R. Value of Test Coupons in Cathodic Protection. Marshall E. Parker. *Oil and Gas Journal,* v. 52, May 11, 1953, p. 126-127.

Use of coupons can determine if full protection is being afforded at a certain point on a structure and can show what the current density is at a given location. (R10)

201-R. Cathodic-Protection Monitor. Marshall E. Parker. *Oil and Gas Journal,* v. 52, May 11, 1953, p. 143.

Emphasizes need for inspecting a cathodic protection system after it has been installed. (R10)

202-R. Paint Industry Forum. "How to Inhibit Corrosion". Robert S. Mercer, George E. Niedt, Ken Keating and John J. Oates, *Paint Industry Magazine,* v. 68, Apr. 1953, p. 16-17.

Presents views of representatives from three indsutries. Minimum requirements for an outdoor metal protective paint. (R26)

203-R. Cathodic Protection Parasites. Marshall E. Parker. *Petroleum Engineer,* v. 25, May 1953, p. D22-D26.

Effect of structures and accessories associated with the pipeline itself. (R10, CN)

204-R. Improvement in Tank Bottom Protection. Hans Schmoldt. *Petroleum Engineer,* v. 25, May 1953, p. D29-D30, D32, D34.

New development to protect crude oil storage tanks from corrosion. Photographs. (R10, CN)

205-R. Cathodic Protection at Compressor Stations. J. C. Berringer. *Petroleum Engineer,* v. 25, May 1953, p. D99-D100.

Installation and advantages offered. (R10, CN)

206-R. Corrosion. G. T. Colegate. *Petroleum Technology, Reviews,* v. 12, 1952, p. 420-432.

Cathodic protection, coating of pipelines, well corrosion, and refinery corrosion. 52 ref. (R7, R10)

207-R. Paint and Corrosion Committees Help Dow Cehmical Fight Corrosion. *Plant,* v. 7, May 1953, p. 47-49.

Discusses work of committees who test various materials; make regular surveys of the plant; set up manuals and specifications; and act as clearing houses for the interchange of data on painting and corrosion. Photographs. (R26)

208-R. (German.) **V_2O_5 Corrosion of Scale Resistant Materials and Their Influence on Individual Alloying Elements.** E. Fitzer and J. Schwab. *Berg- und Hüttenmännische Monatshefte,* v. 98, no. 1, Jan. 1953, p. 1-7.

Investigation of accelerated oxidation in scale resistant alloys shows attack is due to scaling by V_2O_5. Test for resistance to O_2 plus V_2O_5 attack is described. Photographs, graphs, tables. 11 ref. (R2, Cu, Fe, Ni, SS)

209-R. The Logarithmic Growth Law for the Oxidation of Titanium. J. T. Waber, G. E. Sturdy, and E. N. Wise. *American Chemical Society, Journal,* v. 75, May 5, 1953, p. 2269-2270.

Study to determine whether the break in the Arrhenius plot of Gulbransen and Andrew's data is due to change in rate law. (R2, Ti)

210-R. (English.) **Light and Medium-Duty Contact Materials.** J. C. Chaston. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 2, 1953, p. 44-48.

Ways in which thermally unstable surface films of oxides or sulphides may influence contact behavior. (R2, T1, Ag, Pa, Au, Pt)

211-R. (German.) **Special Demands in Corrosion Testing of Lubricants.** A. Bukowiecki. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 1, Jan. 1953, p. 22-31.

Tests on the corrosive effects of lubricants on various metals. (R11)

212-R. (German.) **Specification Issue DIN 50.908 on Testing of Light Metals, Stress-Corrosion Tests.** K. Matthaes. *Werkstoffe und Korrosion,* v. 4, no. 2, Feb. 1952, p. 58-66.

Presents test results in which tension is recorded logarithmically against the life of the sample. (R11, R1, Al)

213-R. (German.) **"Sweating" of Paper and Its Effect on Enclosed Iron Goods.** Gerhard Schikorr. *Werkstoffe und Korrosion,* v. 4, no. 3, Mar. 1953. p. 81-86.

Series of tests for studying formation of "sweat" under varying conditions. (R5, Fe)

214-R. (German.) **Mechanism of Dissolving Metal in HNO_3 With Formation of NO_2 and NO.** E. Abel. *Zeitschrift für Anorganische und Allgemeine Chemie,* v. 271, no. 1-2, Dec. 1952, p. 76-80.

Theoretical discussion of equilibria involved. (R5)

215-R. (German.) **Metallography of Light Metals. Part VI. Corrosive Attack of Pure Aluminum.** Hans Kostron, Elfriede Höffler, and Werner Sautter. *Zeitschrift für Metallkunde,* v. 44, no. 1, Jan. 1953, p. 17-21.

Surfaces which resemble pellets were exposed to the attack of HCl and HNO_3 mixture. (R5, Al)

216-R. (German.) **Kinetics of Wustite Formation During Oxidation of Iron.** Karl Hauffe and Harold Pfeiffer. *Zeitschrift für Metallkunde,* v. 44, no. 1, Jan. 1953, p. 27-36.

Unusual linear character of conversion-time curve during formation of dense covering layers was observed. Describes dependence of velocity constant for FeO and concentrations of nonconformities in gas mixture composition and temperature. Graphs, tables. (R2, Fe)

217-R. (German.) **Practical and Basic Information on Corrosion in a Chemical Plant.** Max Werner. *Zeitschrift fur Metallkunde,* v. 44, no. 2, Feb. 1953, p. 37-43.

Special cases and control measures. Diagrams. (R general, Ag, Cu, Ni, Al, Mg)

218-R. A Case History of Corrosion. Carl R. Davis. *American Gas Association Monthly,* v. 35, May 1953, p. 23-25.

A 16-yr. cathodic protection program. Diagrams. (R10)

219-R. New Field for High Vacuums. *Chemical Engineering,* v. 60, June 1953, p. 134, 136-137.

Use of high-vacuum concentration in heavy chemical and pulp process because low temperatures cut down corrosion and limit scaling. (R general)

220-R. Boiler-Water Treatment to Prevent Corrosion. U. R. Evans. *Engineering,* v. 175, May 8, 1953, p. 602-604.

Survey of boiler problems from the standpoint of fundamental corrosion science. (R4)

221-R. The Influence of Certain Smokes and Dusts on the SO_3 Content of the Flue Gases in Power-Station Boilers. P. F. Corbett and D. Flint. *Institute of Fuel, Journal,* v. 25, May 1953, p. 410-417, 446.

Object of tests was to minimize fouling and corrosion of external heat-exchange surfaces by SO_3 in the flue gases. Tables, graphs. 23 ref. (R9)

222-R. Scaling Characteristics Make or Break a High-Temperature Metal. D. D. Cubicciotti. *Iron Age,* v. 171, May 21, 1953, p. 144-146.

Linear, parabolic, and logarithmic oxidation curves show that parabolic oxidation produces protective coatings. SiO_2 forms a glass which is the best type of protective coating. (R2, SG-h)

223-R. Tests of the Protective Value of Metallic Coatings Under Sheltered Conditions (Marine Atmosphere). S. G. Clarke and W. N. Bradshaw. *Journal of Applied Chemistry,* v. 3, Apr. 1953, p. 147-154.

Results of tests on the corrosion of a range of coatings on steel (electroplated Zn, Cd, Sn, Pb, Ag, Pb-Sn, Sn-Zn, and sprayed Al) and of Ag coatings on Al are presented. Tests were carried out with special reference to the behavior of parts to be used or stored inside unsealed boxes, lockers or cabinets in a marine environment. Photographs, tables. (R3, Zn, Cd, Sn, Pb, Ag, Al, ST)

224-R. Simplified Low-Speed Rotor Techniques for Corrosion Testing. F. Wormwell. *Journal of Applied Chemistry,* v. 3, Apr. 1953, p. 164-169.

Several simplified rotor techniques are described. Corrosion is determined by measurement of weight loss or depth of pitting on specimens in round-rod or sheet form. Results help explain influence of cathodic and anodic polarization on the corrosion of mild steel in sea water. (R11, CN)

225-R. The Effect of Impurities in the Metal on the Rate of Corrosion of

Zinc and Galvanized Coatings in the Atmosphere. P. T. Gilbert. *Journal of Applied Chemistry*, v. 3, Apr. 1953, p. 174-181.

Results of atmospheric exposure tests under effect of additions to the galvanizing bath on the corrosion resistance of hot dipped coatings, and behavior of rolled Zn sheets of differing purity. Tables, graphs. (R3, Zn)

226-R. Methods Used in the Literature for Presenting or Summarizing Corrosion Data. Mars G. Fontana. *Ohio State University Engineering Station News*, v. 25, Apr. 1953, p. 33-35.

Modification of the Shell idea to measure corrosion rate. Graphs. (R11)

227-R. Is Your Plant Corroding? E. W. Wallace. *Oil and Gas Journal*, v. 52, May 25, 1953, p. 201-202, 204, 206, 209.

Typical field experience with gas plant equipment and accessories. Emphasizes that corrosion is not limited to wells alone. (R general)

228-R. Corrosion for Pipeliners. III. Cathodic Protection. Starr Thayer. *Pipe Line News*, v. 25, May 1953, p. 31-32, 34, 36, 38.

Practical application of cathodic protection, sacrificial anodes, rectifiers, preliminary tests, ground beds, and interference. (R10, CN)

229-R. Corrosion in the Pulp and Paper Industry. F. A. Guba. *Tappi*, v. 36, May 1953, p. 134A-137A.

Corrosion with respect to alloys available (Cr-Ni-Fe) and types of corrosion. Tables. (R7, T29, AY)

230-R. Experiences With Field-Applied Inconel Digester Linings. S. J. Baisch. *Tappi*, v. 36, May 1953, p. 221-225.

Experimental attempt was made to solve digester corrosion by field lining a digester with ⅛-in. thick Inconel strip. Results of the experiments. Photographs, diagrams. (R7, Ni)

231-R. Fundamentals of Corrosion and Its Mitigation. E. W. Moore, W. H. Sears, and L. Rubin. *Water & Sewage Works*, v. 100, May 1953, p. R102-R106.

Defines corrosion and describes fundamental reactions and methods of mitigation. (R general)

232-R. (French.) Corrosion Information Center. Shell V.P.I. Treated Paper as a New Corrosion Resisting Packaging Material. *Metaux Corrosion-Industries*, v. 28, no. 330, Feb. 1953, p. 88-90.

Properties and use of Shell vapor phase inhibitor (V.P.I.). Table. (R10)

233-R. (German.) Durability of Al Roofs and Gutters After 20 Years' Service. *Aluminium*, v. 29, no. 1-2, Jan.-Feb. 1953, p. 37.

Al roofs, gutters, and rainpipes put up 21 years ago showed excellent resistance to severe weathering conditions. Photographs. (R3, Al)

234-R. (German.) Polarization and Passivation in Metallic Corrosion. W. Katz. *Metall*, v. 7, no. 5-6, Mar. 1953, p. 161-170.

Nernst formulas were applied to various metals and corrosive media. Graphs. 12 ref. (R10, R11, Ag, Cd, Zn, Sn, Ni, CN)

235-R. (German.) On the Passivity of Iron. Karl Friedrich Bonhoeffer. *Zeitschrift für Metallkunde*, v. 44, no. 3, Mar. 1953, p. 77-81.

Modern passivation and activation phenomena of Fe in acid solution. Graphs, diagrams. 22 ref. (R10, Fe)

236-R. (German.) Passivity of Iron. T. G. Owe Berg. *Zeitschrift für Metallkunde*, v. 44, no. 3, Mar. 1953, p. 82-83.

Conclusions resulting from measurements of solubility velocities and potentials of Cu and Fe in HNO_3 at various concentrations. Graphs, diagrams. 6 ref. (R10, Fe, Cu)

237-R. (German.) Stress Corrosion of Aluminum Alloys. Paul Brenner. *Zeitschrift für Metallkunde*, v. 44, no. 3, Mar. 1953, p. 85-91.

Lists four measures for elimination of corrosion sensitivity of Al alloys. Photographs, graphs, diagrams. 59 ref. (R1, Al)

238-R. (Russian.) Corrosion Resistance and Weldability of EZn-1 Steel. E. D. Surovtseva, N. V. Suknobokova, and E. M. Lapitskaia. *Avtogennoe Delo*, v. 23, no. 9, Sept. 1952, p. 8-12.

Investigation of EZh-1 steel (0.08-0.06% C, 0.46-0.21% Mn, 0.03-0.20% Si, 12.61-11.93% Cr, 0.23-0.11% Ni, 0.020-0.015% S, 0.026-0.025% P). Data are tabulated. Micrographs, photographs. (R general, K9, SS)

239-R. (Book.) Marine Fouling and Its Prevention. Woods Hole Oceanographic Institution. 388 p. 1952. U. S. Naval Institute, Annapolis, Md.

Problems, biology, and prevention of fouling. In some cases the aim is to meet requirements of specialists by reviewing technical details; in others the intent is to inform specialists about pertinent matters with which they may not be familiar. (R4)

240-R. (Book—Russian.) **Corrosion of Chemical Apparatus and Corrosion-Resistant Materials.** I. Ya. Klinov. 291 p. 1950. Governmental Scientific-Technical Publishing House, Moscow, U.S.S.R.

Information on high-alloy steels and irons being produced in Russia. Russian "marks" are tabulated to illustrate discussion of materials which resist corrosion at both high and low temperatures. (R general, SG-g)

S

INSPECTION AND CONTROL

160-S. Measurement of Steel Bath Temperature. R. D. Hindson and J. P. Orton. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings*, v. 35, 1952, p. 143-145.

Discusses advantages gained through methods of bath pyrometry. (S16, D2)

161-S. Measurement of Bath Temperatures in the Open Hearth. D. J. Carney and J. J. Oravec. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings*, v. 35, 1952, p. 145-151.

Desirability of using thermocouple pyrometers. Tables. 7 ref. (S16, D2)

162-S. Measurement of Steel Bath Temperature. Oscar Pearson and F. B. Coffman. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings*, v. 35, 1952, p. 152-161.

Methods, applications, and results of spoon immersion method. Graphs, diagrams, and tables. (S16, D2)

163-S. Measurement of Open Hearth Bath Temperature. J. R. Brady. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings*, v. 35, 1952, p. 162-165; disc., p. 165.

Modification of immersion process. Diagrams and graphs. (S16, D2)

164-S. Methods and Advantages of Temperature Control. Francis H. Hohn. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings*, v. 35, 1952, p. 202-210; disc., p. 211-212.

Procedure and results. Graphs and photographs. (S16, D2)

165-S. (English.) Alizarin Blue as a Reagent for Traces of Copper. F. Feigl and A. Caldas. *Analytica Chemica Acta*, v. 8, no. 2, Feb. 1953, p. 117-121.

A test which detects Cu to a limit of 0.0025 by a spot reaction. A blue, acid resistant, inner complex is formed. 4 ref. (S11, Cu)

166-S. (English.) Paper Chromatography of Inorganic Ions. V. The Preparation of Carrier-Free Isotopes by Paper Chromatography. M. Lederer. *Analytica Chemica Acta*, v. 8, no. 2, Feb. 1953, p. 134-139.

Above was used to separate the following carrier-free radio-isotopes: Na-Mg, Rh-Fe, Pd-Rh, Co-Fe, Zn-Cu, and U-Pa. Diagrams. 13 ref. (S11, Na, Mg, Rh, Fe, Pd, Co, Zn, Cu, U, Pa)

167-S. (French.) Separation of Scandium From Lanthanum and Yttrium. P. Radhakrishna. *Analytica Chemica Acta*, v. 8, no. 2, Feb. 1953, p. 140-145.

Use of a resin ion exchange column and an eluent of citric acid at different pH levels. The hysteresis phenomenon of Sc is also treated. Diagrams. 4 ref. (S11, La, Sc, Y)

168-S. Automatic Machine Assembles, Inspects Small Parts. J. J. Obrzut. *Iron Age*, v. 171, May 7, 1953, p. 236-238.

Use of a special-purpose machine to automatically assemble airhorn assemblies of carburetors. Safety devices are used throughout machine. Failure of operator, machine, or assembly automatically stops the machine. Photographs. (S18, A5)

169-S. You Can Get Better Case Depth Measurements. A. D. Kirshenbaum and H. C. Boynton. *Iron Age*, v. 171, May 14, 1953, p. 138-140.

Use of isotopes such as C^{14} and Co^{60} to measure depth of C absorption in case hardened 1020 steel. Micrographs. (S19, J28, CN)

170-S. Chemical Compositions of SAE Carbon Steels. *Machine and Tool Blue Book*, v. 49, May 1953, p. 235, 237, 239.

Tabulated information on various steels. (S22, CN)

171-S. Statistical Quality Control. Watchdog of Ford Finishes. Frank L. Bonem. *Products Finishing*, v. 17, May 1953, p. 22-32, 34.

Relates application of statistical quality control to finishing operations performed in the Dearborn assembly plant. (S12)

172-S. An Automatic Controller for Radiofrequency Induction-Heating Units. J. J. Theron. *Review of Scientific Instruments*, v. 24, Apr. 1953, p. 281-282.

Simple, rugged, and adaptable device for regulating power provided by an industrial rf generator for induction heating. Regulation of temperature within ±½° at 1000° C. was achieved where system is not disturbed in any way. (S16, J2)

173-S. X-Ray Gaging Irons Out Strip Variables. B. H. McGar. *Steel*, v. 132, May 18, 1953, p. 110.

Electronic gaging of Cu alloy strip. (S14, Cu)

174-S. (French.) Automatic Regulation. A. Liebaut. *Flamme et Thermique*, v. 6, no. 54, Mar. 1953, p. 33-42.

Treats control, accuracy, sensitivity, precision, and compensation of the above mathematically; includes types of adjustment. Graphs, diagrams. (To be continued.) (S16)

175-S. Production Inspection X-Ray. David Goodman. *Aero Digest,* v. 66, May 1953, p. 22-25.

Inspection of Al, Mg, and steel castings used in aircraft. Photographs. (S11, Al, Mg, CI)

176-S. The Sampling of Pig and Cast Iron for Carbon Determination. W. E. Clarke. *British Cast Iron Research Association Journal of Research and Development,* v. 4, Apr. 1953, p. 496-519.

Sampling flake graphite materials. Results showed that difficulties of obtaining a representative sample for C determination depend not so much on the total C content as on the size and distribution of the graphite. Micrographs, tables. (S11, CI)

177-S. The Scope and Future of Isotope Utilization. Paul C. Aebersold and Edwin A. Wiggin. *Journal of Chemical Education,* v. 30, May 1953, p. 229-234.

History of radioactivity, use of isotopic materials for analysis, and training chemists in handling and using radioisotopes. (S11)

178-S. Automatic Metal Gauging Using X-Rays. John F. Howell. *National Electronics Conference, Proceedings,* v. 8, 1952, p. 121-126.

A noncontacting X-ray gage using two CdS cells for determining thickness of metal parts. Diagrams, photographs. 4 ref. (S14)

179-S. Non-Destructive Nuclear Measurements of Waveguide Plating Thickness. H. V. Watts, C. A. Stone, and L. Reiffel. *National Electronics Conference, Proceedings,* v. 8, 1952, p. 134-143.

Technique based on thermal neutron activation, where Ag, Cu, and Zn are made radioactive and measured by a thin-window Geiger counter. Prototype instrument using this principle is capable of handling straight sections of guide up to 3 ft. in length complete with flanges. Tables, photographs. (S14, Ag, Cu, Zn)

180-S. The Vacuum Fusion Technique as Applied to the Analysis of Gases in Metals. R. A. Yeaton. *Vacuum,* v. 2, Apr. 1952, p. 115-124.

Present state of this technique. Diagrams. 47 ref. (S11)

181-S. Material Evaluation. Andrew LaCorte. *Wire and Wire Products,* v. 28, May 1953, p. 478. 504.

Slide control device designed to evaluate and predetermine the end result of a known rod chemical analysis before drawing. (S11, CN)

182-S. (French.) Polarographic and Spectrographic Identification of Cadmium in Iron and Steel Products. Emile Jaudon. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 236, no. 11, Mar. 16, 1953, p. 1166-1167.

2 references. (S11, Cd)

183-S. (French.) Physical Chemistry. Separation of Niobium and Tantalum by Chromatography on Activated Alumina. Nicolas Tikhomiroff. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences.* v. 236, no. 12, Mar. 23, 1953, p. 1263-1265.

2 references. (S11, Ta, Nb)

184-S. (French.) Separation of Na^{22} From Magnesium Target by Electrolysis on a Renewed Mercury Cathode. Marius Chemla and Jules Pauly. *Société Chimique de France, Bulletin,* no. 4, Apr. 1953, p. 432.

Concludes that the above is an easy and satisfactory method. Graph, diagram. 7 ref. (S11, Na, Mg)

185-S. (German.) Standardization of Technical Surfaces. Willy Schenkel and Walter Schmidt. *Metalloberfläche,* v. 7, ser. A, no. 1, Jan. 1953, p. A1-A6.

DIN standard specimens were examined. Surface measurements were explained and compared with foreign standards. Symbolic representation of roughness is discussed. Tables, diagrams. (S22, S15)

186-S. (German.) Surface Measurement With Keyed Cutting Apparatus. Walter Schmidt. *Metalloberfläche,* v. 7, ser. A, no. 3, Mar. 1953, p. A33-A38.

Surveys available machinery. Discusses DIN (German Industrial Norm) numbers. Graphs, photographs. (S15)

187-S. (German.) Interference Colors in Electrolytically Separated, Thin Metallic Films. Artur Kutzelnigg. *Metalloberfläche,* v. 7, ser. B, no. 3, Mar. 1953, p. B39-B40.

Use of interference colors as the simplest method of analyzing metallic layers with relatively low atomic weights. (S15)

188-S. (German.) Nondestructive Electronic Classifying of Metals According to Their Physical Properties. F. Forster. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 2, 1953, p. 57-66.

Theoretical basis for numerous electronic and magnetic testing devices now in use. Graphs, diagrams. (S13)

189-S. (German.) Ultrasonic Testing of Weld Seams. Hans Krächter. *Stahl und Eisen,* v. 73, no. 5, Feb. 26, 1953, p. 279-283.

Ultrasonic test heads were used to detect cracks, pores, and inclusions in welds up to 45 mm. thick. Results were compared by using γ and α-radiation tests. (S13, K9)

190-S. (German.) Determination of Boron in Aluminium-Boron Alloys. E. Eipeltauer and G. Jangg. *Zeitschrift für Analytische Chemie,* v. 138, no. 1, 1953, p. 18-29.

B content as low as 0.3% was detected by separating Al with NaOH. (S11, B)

191-S. (German.) Determination of Aluminium as Oxyquinolate. Karl Ernst Stumpf. *Zeitschrift für Analytische Chemie,* v. 138, no. 1, 1953, p. 30-41.

Describes methods based on precipitation from homogeneous solution. Tables. (S11, Al)

192-S. (German.) Determination of Phosphorus as Quinolin-Phosphomolybdate in Swedish Iron Ores. Uno Fernlund, Sepp Zechner, and Thyr Andersson. *Zeitschrift für Analytische Chemie,* v. 138, no. 1, 1953, p. 41-44.

New method in which P is precipitated as quinolinphosphomolybdate and then determined volumetrically. (S11, Fe)

193-S. (German.) Influence of Iron on Polarographic Analysis. R. Geyer. *Zeitschrift für Anorganische und Allgemeine Chemie,* v. 271, no. 1-2, Dec. 1952. p. 93-100.

By reducing trivalent Fe with hydrazine sulfate, hindering effect of large amounts of Fe^{+++} were eliminated. Important steel-alloying elements, Cu, Mo, and V were detected in presence of each other. Graphs. (S11, Fe, Cu, Mo, V)

194-S. How to Specify Iron Water Pipe. Howard F. Rase. *Chemical Engineering,* v. 60, June 1953, p. 242-243.

Various specifications and how to use them. (S22, CI)

195-S. Open-Hearth-Furnace Bath Temperature Pyrometry. L. H. Veiock. *Instruments,* v. 26, May 1953, p. 722-723. 754.

Immersion thermocouple system, radiation immersion units, recorders, and users' opinions on both types of units. Diagrams. (S16, D2)

196-S. Fluoroscopic Inspection Provides Rapid Check of Aircraft Alloy Castings. Justin G. Schneeman. *Western Metals,* v. 11, May 1953, p. 59-61.

Inspection of Al and Mg castings. Photographs. (S13, Al, Mg, AY)

197-S. (French.) Flame Spectra of the Rare Earths. Maurice Piaia. *Journal des Recherches du Centre National de la Recherche Scientifique,* no. 21, Dec. 1952, p. 260-270.

Flame spectra of Ce series, Sc, Y, and La. A possibility of spectrophotometric analysis of these elements is suggested from this study. (S11, EG-g)

198-S. (German.) Fundamentals of Modern Statistical Evaluative Procedures Relative to Sampling. Hans Klein. *Archiv für das Eisenhüttenwesen,* v. 24, no. 1-2, Jan.-Feb. 1953, p. 11-20.

Graphs and tables. 5 ref. (S12)

199-S. (German.) Ultrasonic Testing of Rolls and Steel Flasks. Hugo Josef Seemann and Werner Bentz. *Archiv für das Eisenhüttenwesen,* v. 24, no. 1-2, Jan.-Feb. 1953, p. 47-52.

Tests were carried out with a SCAM device. Describes combined ultrasonic and echo process used to test steel flasks for highly compressed gases. Photographs, diagrams. 4 ref. (S13, ST)

200-S. (Book.) Analysis of Aluminum Alloys. G. H. Osborn and W. Stross. 144 p. Chemical Publishing Co., 212 Fifth Ave., New York 10, N. Y. $3.50.

Survey of analytical methods, including new, standard, and modifications of standard procedures. Methods range from those requiring modern physicochemical instruments, such as polarograph and photometer, to those which may be carried out with normal laboratory equipment. Methods for determination of Be, Bi, Ca, Ag, and Na are described. (S11, Al)

201-S. (Book.) Bibliography on X-Ray Analysis With Subject Index. Ed. 2. Herbert R. Isenburger. 17 p. 1953. St. John X-Ray Laboratory, Califon, N. J.

In addition to the bibliography, there is material on the X-ray method and a subject index. (S general)

202-S. (Book.) Precision Measurement in the Metal Working Industry. Dept. of Education of International Business Machines. 365 pages. 1952. Syracuse University Press. $6.00.

Chapters deal with line-graduated instruments; precision gage blocks; plug, ring, snap thread, and dial gages; test indicators; micrometers; verniers; surface plates and accessories; angle-measuring instruments, comparators; optical instruments and surface finish measurement; measuring machines; hardness testers ; and non-destructive testing methods. (S general, Q29)

T

APPLICATIONS OF METALS IN EQUIPMENT

123-T. New Materials and Methods. Part I. Asbestos-Phenolic and Glass-Fibre Plastics. Methods of Moulding. Part II. Polyester, Phenolic and Foaming Resins. Metal Bonding. Integral Construction. Magnesium and Titanium Alloys. H. J. Pollard. *Aircraft Production,* v. 15, Apr. 1953, p. 126-131; May 1953, p. 183-192.

Includes tables, graphs, and photographs. (T24, Mg, Ti)

124-T. Copper-Aluminum Plates Show Great Promise. Charles W. Latham. *American Printer,* v. 134, May 1953, p. 38, 51-52.

Procedure for making Cu on Al bimetal plate from either negatives or positives. Shows that for long runs they are inexpensive, easy to make, and almost foolproof. (T9, L22, Cu, Al)

125-T. A High-Pressure Wire Gage Using Gold-Chrome Wire. H. E. Darling and D. H. Newhall. *ASME, Transactions,* v. 75, Apr. 1953, p. 311-314.

Development of Au-Cr wire for pressure-sensing devices. Graphs. (T8, Au, Cr)

126-T. Metals and Modern Aircraft. J. Gordon Parr. *Discovery,* v. 14, May 1953, p. 157-161.

Considers "Duralumin", Mg alloys, Ti, and Mo with respect to creep, fatigue, and corrosion at high temperatures. Photographs. (T24, Q3, Q7, R general, Al, Mg, Ti, Mo)

127-T. The Use of Nickel in Valves. K. Jackson and R. O. Jenkins. *Electronic Engineering,* v. 25, May 1953, p. 208-211.

Some metallurgical problems in electronic tubes and how they are being solved with use of Ni. (T1, Ni)

128-T. Aluminium Plate Girders. *Engineering,* v. 175, May 1, 1953, p. 569.

Use of Al plate girders to reduce deadweight and to facilitate erection. (T26, Al)

129-T. Germanium in Coal Ash. K. Steward. *Gas Journal,* v. 274, Apr. 29, 1953, p. 279-280.

Presence in coal ash, uses in industry, and methods of determination. (T general, S11, Ge)

130-T. Selecting Materials for Small Assemblies. Leo B. Glaser. *Materials and Methods,* v. 37, May 1953, p. 101-103.

Shows that intelligent materials selection in the design stage leads to economical fabrication of small assemblies. Uses steel tape rule as example. (T8, ST)

131-T. Aluminum Mine Props Save Labor, Last Longer, Improve Safety in German Coal Mines. Max Stern. *Mining Engineering,* v. 5, May 1953, p. 492-493.

Use of Al props to replace timber in steep formations and longwall mining. Photographs. (T28, Al)

132-T. Magnesium. The Challenge to Offset? Part I. A. R. Tommasini. *Pacific Printer and Publisher,* v. 89, Apr. 1953, p. 25-26; May 1953, p. 23-24.

Advantages of using Mg plates. (T9, Mg)

133-T. Bi-Metal Plates Spell Economy. Charles W. Latham. *American Printer,* v. 134, Apr. 1953, p. 31, 66-68.

Describes the Cu-Al plate which shows promise for economical runs of 1-2 million. (T9, Cu, Al)

134-T. Automotive Engine Bearings. *Lubrication,* v. 39, May 1953, p. 61-76.

Properties required of a bearing material; use of white metal alloys, Sn- and Pb-base babbitts, Cd alloys, Cu-Pb alloys, impregnated Cu-Ni alloy, and Al alloys; bearing manufacture; lubrication and lubricants; and bearing life, failure, and corrosion. Micrographs, tables, photographs. (T7, Sn, Pb, Cd, Cu, Ni, Al)

135-T. Trays for Metal Treating. *Metal Trends,* v. 1, no. 2, p. 5-8.

Selection of material, tray design, and service performance. Diagrams. (T5, J general, SG-h)

136-T. From Tumblers to TV. *Metal Trends,* v. 1, no. 2, p. 9-12.

Shows that majority of glass parts produced are pressed or blown in metal molds. Use of metal molds to produce television tubes. Photographs. (T29, CI)

137-T. The Key to Atomic Power. Karl Cohen. *Nucleonics,* v. 11, May 1953, p. 10-13.

Shows that a low-cost reactor can be achieved by inventive design with relatively minor advances in present technology. Abundance and cost of uranium. 11 ref. (T25, A4, U)

138-T. Recent Advances in Reactor Technology. Alvin M. Weinberg. *Nucleonics,* v. 11, May 1953, p. 18-20.

Problems of breeding and achieving high flux. "Homogeneous reactor experiment", "materials testing reactor", and others are described in relation to these problems. (T25, U)

139-T. Clad Steel in Petroleum Equipment. Albert Hoersch, Jr. *Petroleum Processing,* v. 8, May 1953, p. 700-703.

When to use and when not to use clad steel in processing units. Welding and fabrication. Tables, diagrams. (T29, L22, CN, Ni)

140-T. (French.) **Use of Anodized Aluminum as Electrical Conductors in Aeronautical Equipment. Insulating and Refractory Characteristics of Alumina Coatings.** H. Bardot. *Métaux Corrosion—Industries,* v. 28, no. 329, Jan. 1953, p. 19-23.

Recommends that alumina insulated conductors be used on rotor windings, transformers, lifting electromagnets or in situations where the insulation is subjected to sudden high temperatures or humid atmospheres. (T1, Al)

141-T. (French.) **"Antilles" and "Flandre" Liners of the French Line.** *Revue de l'Aluminium,* v. 30, no. 196, Feb. 1953, p. 57-66.

Describes and illustrates 20,419-ton passenger ships in which large use of light metals was made. (T22, Al)

145-T. (French.) **Light Metal Coffering Device for the Cement Lining of Galleries and Tunnels.** *Revue de l'Aluminium,* v. 30, no. 196, Feb. 1953, p. 80-81.

Coffering device, composed of light metal extrusions, offers lightness of wood with wear resistance and strength of steel. (T28, Al)

143-T. (French.) **Steel Cables and Electric Conductors for Overhead Lines.** O. Bachmann. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 1, Jan. 1953, p. 14-22.

Modern manufacturing and construction techniques. (T1)

144-T. (French and German.) **Aluminum Container for Use in Breweries.** *Aluminium Suisse,* v. 3, no. 1, Jan. 1953, p. 2-8.

General discussion of various types of Al containers used in Swiss breweries. Photographs. (T29, Al)

145-T. (French and German.) **Light-Metal Installations.** *Aluminium Suisse,* v. 3, no. 1, Jan. 1953, p. 9.

Al fermentation vats and other containers in Swiss breweries using the Nathan process. (T29, Al)

146-T. (French and German.) **Light-Metal Beer Casks.** Fritz Kutter. *Aluminium Suisse,* v. 3, no. 1, Jan. 1953, p. 10-24.

Corrosion resistant casks manufactured in Switzerland. (T29, Al)

147-T. (French and German.) **Ultra-Light Coaches of the Basel Streetcar Systems.** W. Würth. *Aluminium Suisse,* v. 3, no. 1, Jan. 1953, p. 25-27.

Advantages of newly constructed Al coaches include reduced maintenance cost due to mechanical and electrical simplifications; less wear on tracks; and shorter stops for receiving and discharging passengers. (T23, Al)

148-T. (French and German.) **Use of Aluminum in the Manufacture of Computing Machines.** *Aluminium Suisse,* v. 3, no. 1, Jan. 1953, p. 32.

The Curta calculating machine, a small pocket-size apparatus that adds, divides, multiplies, and subtracts. (T10, Al)

149-T. (German.) **Design Characteristics for Aluminum Structures.** W. Bleicher. *Aluminium,* v. 29, no. 3, Mar. 1953, p. 91-101.

Designing with extrusions and fabrication of sheet structures. (T26, F24, Al)

150-T. (German.) **Aluminum Paint.** A. Müller. *Aluminium,* v. 29, no. 3, Mar. 1953, p. 106-110.

Composition, manufacturing process, and various uses. (T29, Al)

151-T. (German.) **Metals and Tissue.** Werner Bufe. *Werkstoffe und Korrosion,* v. 4, no. 3, Mar. 1953, p. 95-99.

Need for corrosion resistant metals, suitable for use in the human body as supports for injured parts. Advantages and disadvantages of using Ta. (T10, R7, Ta)

152-T. When You Drill an Oil Well. E. J. Tangerman. *American Machinist,* v. 97, May 25, 1953, p. 137-146.

Production of drilling bits. (T6, T28, AY)

153-T. Demand for and Supply of Tubular Goods. Present and Future. R. C. Zell. *American Petroleum Institute, Proceedings,* v. 32, sec. IV, 1952, p. 15-20; disc., p. 20-22.

Supply-and-demand of tubular steel goods for the oil industry and effects of increased production and deeper drilling. Recent developments. (T28, A4, ST)

154-T. Men, Materials, and Power. A Trio in Action. Norman L. Mochel. *ASTM Bulletin,* May 1953, p. 54-62.

Reviews development of steam turbines, possible future developments of gas and atomic-powered turbines. Use of various metals in turbine blading. Graphs, photographs. (T25, CN, SS, Ni, Al, Ti)

155-T. Light-Alloys in Mechanical Handling. *Light Metals,* v. 16, Mar. 1953, p. 87-88; Apr. 1953, p. 135-137; May 1953, p. 151-152.

Uses of Al and Mg in equipment devised for solving handling problems in industry and commerce. (T5, Al, Mg)

156-T. Zirconium for the Atomic Powered Submarine. *Modern Metals,* v. 9, May 1953, p. 42, 44.

Production, physical, and chemical properties. Photographs. (T22, T25, Zr)

157-T. Stainless Helps Cortisone Make Medical History. *Steel Horizons,* v. 15, no. 2, 1953, p. 12-13.

Stainless steel equipment. Photographs. (T10, SS)

158-T. Direct-Reading Design Charts for 24S-T3 Aluminum-Alloy Flat Compression Panels Having Longitudinal Formed Hat-Section Stiffeners and Comparisons With Panels Having Z-Section Stiffeners. William A. Hickman and Norris F. Dow. National Advisory Committee for Aeronautics, Washington. D. C., Technical Note 2792 Mar. 1953 71 p.

Theoretical discussion including graphs and tables. (T24, Q28, Al)

159-T. (French and German.) **Intercontinental Airport, Zurich.** E. Müller. *Aluminium Suisse,* v. 3, no. 2, Mar. 1953. p. 57-61.

Light-metal construction of new terminal; dust cover of passenger waiting hall; cabin-structure of control tower; and overhang above right-of-way to main entrance. Photographs, diagrams. (T26, Al)

160-T. (French and German.) **Light Metal Cranes.** W. Stadelmann. *Aluminium Suisse,* v. 3, no. 2, Mar. 1953, p. 66-70.

Five and 10-ton cranes built completely of light metal. Photographs, diagrams. (T5, Al)

161-T. (French.) **Heat Resistant Materials. Fireproof Electrical Cables.** M. Gau. *Metaux Corrosion-Industries,* v. 28, no. 330, Feb. 1953, p. 75-78.

Diagrams. (T1, SG-h)

162-T. (German.) **Aluminum Roof Coverings.** H. Kentzler and J. Schroeder. *Aluminium,* v. 29, no. 1-2, Jan.-Feb. 1953, p. 31-35.

Chemical behavior and workability of corrugated-sheet and "Fural"-aluminum roofs. Photographs. (T26, Al)

163-T. (German.) **Aluminum Materials in Bridge Construction.** O. Lieb-ing. *Aluminium,* v. 29, no. 1-2, Jan.-Feb. 1953, p. 46-49.

Use of light metals, particularly Al, with steel. Compares weights, loadings, and construction costs. Graphs. (T26, Al, ST)

164-T. (German.) **Dam-Gate Guards for Power Plant at Birsfelden.** Alfred Gutknecht. *Zeitschrift für Schweisstechnik; Journal de la Soudure,* v. 43, no. 4, Apr. 1953, p. 59-62.

Qualities of materials used for guards; welding problems. Tables, photographs. (T4, K general, CN)

V

MATERIALS
General Coverage of Specific Materials

57-V. Low-Zinc Brasses. *Copper & Brass Bulletin,* no. 164, May 1953, p. 8-9.

Properties and uses of various brasses. (Q general, T general, Cu)

58-V. Carboloy Cemented Carbide. Hardest Man-Made Metal. Kenneth R. Beardslee. *General Electric Review,* v. 56, May 1953, p. 51-55.

Problems, progress, applications, future uses. Photographs. (W, C-n)

59-V. Corrosion-Resistant Alloy Combines Heat and Corrosion Resistance With Workability. *Machine Design,* v. 25, May 1953, p. 151-152.

Describes Hastelloy F, which was developed as an intermediate in corrosion resistance, workability, and cost between austenitic stainless steels and Ni-Mo alloys. (R general, Q23, Ni, SG-g, h)

60-V. A New Corrosion Resistant Alloy. Its Properties and Possible Uses. *Materials and Methods,* v. 37, May 1953, p. 92-93.

Corrosion resistance, fabrication, and applications of Hastelloy F. (R general, T general, Ni)

61-V. The Story of Nickel Since 1939. W. G. Wright. *Australasian Engineer,* Mar. 1953, p. 42-50.

An account of the International Nickel Co.'s activities since 1939. General information on known important world sources of Ni, and some description of new mining constructions by Inco. Postwar developments in relation to Ni, including Nimonic alloys, alloy cast irons, improved Ni-Fe magnetic alloys, Ni in powder metallurgy, and spheroidal graphite cast iron. Brief notes on the extraction of the precious metals from electrolytic sludges. Photographs. (Ni)

62-V. The Investigation of Titanium Alloy Systems. G. L. Miller. *Industrial Chemist,* v. 29, May 1953, p. 207-213.

Comprehensive review of U. S. developments in the study of Ti. Graphs, micrographs. 12 ref. (Ti)

63-V. (French and German.) **Raffinal—Its Preparation and Application.** H. Bettler. *Aluminium Suisse,* v. 3, no. 2, Mar. 1953, p. 51-54.

"Raffinal" (trade-marked name for purest Al) is discussed in terms of its preparation, chemical and physical properties, and uses. (Al)

EMPLOYMENT SERVICE BUREAU

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POSITIONS OPEN

East

METALLURGIST: Physical, lead and lead alloys, investigation of creep, fatigue, bending and other mechanical properties. Industrial research laboratory located northern New Jersey within commuting distance New York City. Box 7-35.

HEAT TREAT SUPERVISOR: Graduate metallurgist preferred. Must have experience in tool, die and small part work. Have ability to properly fixture work. Know steels and their treatments. Imaginative, capable, dependable. This is no ordinary job. Salary commensurate with ability. Give complete details in reply as to age, experience, availability, salary. Box 7-40.

METALLURGIST: Recent graduate under 30 years of age for position in methods and research department of long-established company in New England. Will work on problems of nonferrous metals, stainless steel and die steels. Give qualifications and salary expected. Box 7-45.

TOOL AND DIE HARDENER: Must have working knowledge of all toolsteels and applications; atmosphere control furnaces. Excellent pay for the right man. Box 7-50.

INDUCTION HEATING SALESMEN: Positions open for qualified personnel in sales and application engineering. Technical graduates or equivalent in metallurgy, electrical and mechanical, or combination of above with good personalities and business sense. Men who like to meet people and work with them on a broad scope of application problems rather than specializing in narrow field of design. Experience in induction heating field desirable. Box 7-55.

METALLURGIST: Opportunity for qualified metallurgist in nonferrous field. Young man with degree in metallurgical engineering required. Reputable company producing nickel silver, phosphor bronze and nickel anodes. Box 7-60.

West

MANUFACTURERS REPRESENTATIVE: Precision casting organization now being formed, to be located in Los Angeles, needs sales representation on West Coast, particularly in Los Angeles area. Regular contact with users of small parts essential. Familiarity with this process helpful but not necessary. Write giving full details as to sales experience and lines currently represented. Box 7-145.

Midwest

METALLURGICAL ENGINEERS: Needed now for metallurgical research and development program in country's foremost independent research organization. Project diversification covering all phases of ferrous and nonferrous technology provides the type of stimulus necessary for professional achievement and individual satisfaction. Please write to: Battelle Memorial Institute, 505 King Ave., Columbus 1, Ohio.

METALLURGIST: Central Ohio manufacturer, widely diversified line, has opening in metallurgical department for recent graduate. Work will involve metallurgical testing, inspection and control. Experience not necessary. Box 7-65.

WELDING RESEARCH SUPERVISOR: Industrial research organization covering broad field of welding and the physical metallurgy of welding. Activity must cover theoretical work, electrical aspects, and application of welding and brazing processes. Promising opportunity with excellent metallurgical supporting department. Write: Metals Research Manager, Armour Research Foundation of Illinois Institute of Technology, 35 West 33rd St., Chicago 16, Ill.

METALLURGIST: Large steel fabricating plant located in central Indiana has opening for metallurgist or engineering graduate with ferrous metallurgical experience and training for material and product control laboratory. Excellent opportunity for qualified person. Reply giving details of age, education, experience and salary expected. Box 7-70.

METALLURGISTS: Graduate metallurgists for research and development with large automotive manufacturer in Detroit. Either ferrous or nonferrous specialty is acceptable. Opportunities are excellent for gaining experience and advancement. Box 7-75.

TECHNICAL DIRECTOR: To set up and administer technical program for national association of sheet metal fabricating companies. Die design and characteristics of sheet metal flow are important aspects of job. Required to prepare technical programs and speak before regional meetings. Send full particulars in confidence to: Hall and Liles, 1643 National Bank Bldg., Detroit 26, Mich.

POSITIONS WANTED

METALLURGICAL ENGINEER: B.S. degree. Twenty years varied experience in ferrous and nonferrous metallurgy. Experienced in suprvision, sales, development, research and production. Eight years experience in high-temperature metallurgy, some foundry and fabrication experience. Desires to relocate in East, preferably in New York State. Box 7-80.

METALLURGICAL ENGINEER: B.S. degree, some graduate work. Six years diversified experience in shop and laboratory. Extensive knowledge of latest developments in titanium. Knows Air Force specifications. Desires position in manufacturing development or sales engineering. Prefers West or Southwest. Box 7-85.

TECHNICAL DIRECTOR: Metallurgical and materials engineering. Nineteen years diversified experience, including problems of design, specifications, plant layout, production planning, fabrication, heat treatment, testing, inspection, quality control. Degree in metallurgy. Limit of opportunity in present midwestern manufacturing company reached. Available on reasonable notice. Box 7-90.

METALLURGICAL ENGINEER: Graduate, married, children. Five years experience includes high-temperature alloys, steels and nonferrous alloys. Well grounded in heat treat and fabrication methods. Successful record in development, production problems, quality control and personnel management. Box 7-95.

CHEMIST-METALLURGIST: Married, B.S. degree in chemistry, 1950. Age 28, with teaching and laboratory experience plus additional course work in metallurgy and chemistry. Desires a position insuring security and a future with progressive ferrous or nonferrous metallurgical laboratory in Baltimore-Washington area. Lowest acceptable salary in vicinity $100 week. Box 7-100.

METALLURGIST: Production, research or sales. B.S. degree, age 42. Twenty years diversified experience in all phases of manufacturer, processing, fabrication and sales engineering of alloy and specialty steels, including 12 years with corrosion and heat resisting grades. Outstanding record of accomplishment. Proven administrative ability, technical writer and consultant. Wide knowledge of quality control methods. Interested only in responsible position. Box 7-105.

SALES: Successful background in warehouse selling of ferrous and nonferrous metals. Familiar with Kansas-Missouri area. Experienced with aluminum for aircraft industry. Available as mill or warehouse sales representative, would relocate. Metallurgy training, past A.S.M. chapter chairman, age 39, married with family. Box 7-110.

METALLURGIST: Age 36, married, two children. Sixteen years mill experience, production trouble shooting and commercial heat treat experience. Desires position with future in metals producing, fabricating or treating industry in metallurgical capacity. Will relocate. Box 7-115.

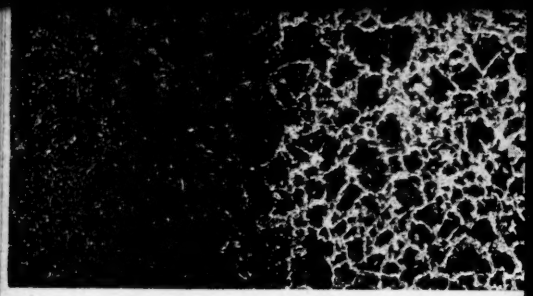
METALLURGICAL ENGINEER: B.S. degree, some graduate study. Married, age 30. Solid background in ferrous metallurgy with five years steel mill experience and two in automotive industry. Experience includes production heat treating control, metallurgical laboratory procedures, failure analysis and heat treat specifications. Desires responsible position with opportunity. Midwest firm preferred but not essential. Box 7-120.

METALLURGICAL ENGINEER: Has had 17 years of research, development and supervisory experience with leading industrial fabricator. Fully conversant with new super-alloys, welding methods, fabrication processes, heat treatment and research laboratory techniques. Willing to sacrifice salary for opportunity with small aggressive company with chance for advancement. Age 36, married, no children. Box 7-125.

METALLURGICAL ENGINEER — ADMINISTRATIVE: B.S. degree, age 42, married, two children. Ferrous and nonferrous, cast or rolled, tool and die steel applications, metallurgical control, trouble shooting, manufacturing and service problems, vendor and customer contact, research and development, some teaching, editing, technical writing and publishing. Desires responsible and challenging position where executive ability is required. Box 7-130.

METALLURGIST: B.S. degree, age 33, married, children. Seven years experience in heat treating of ferrous and nonferrous alloys, including carburizing and nitriding. Four years also included physical testing and metallography. Three years in chemical analysis and rubber testing. Location not important, willing to travel. Available immediately. Box 7-135.

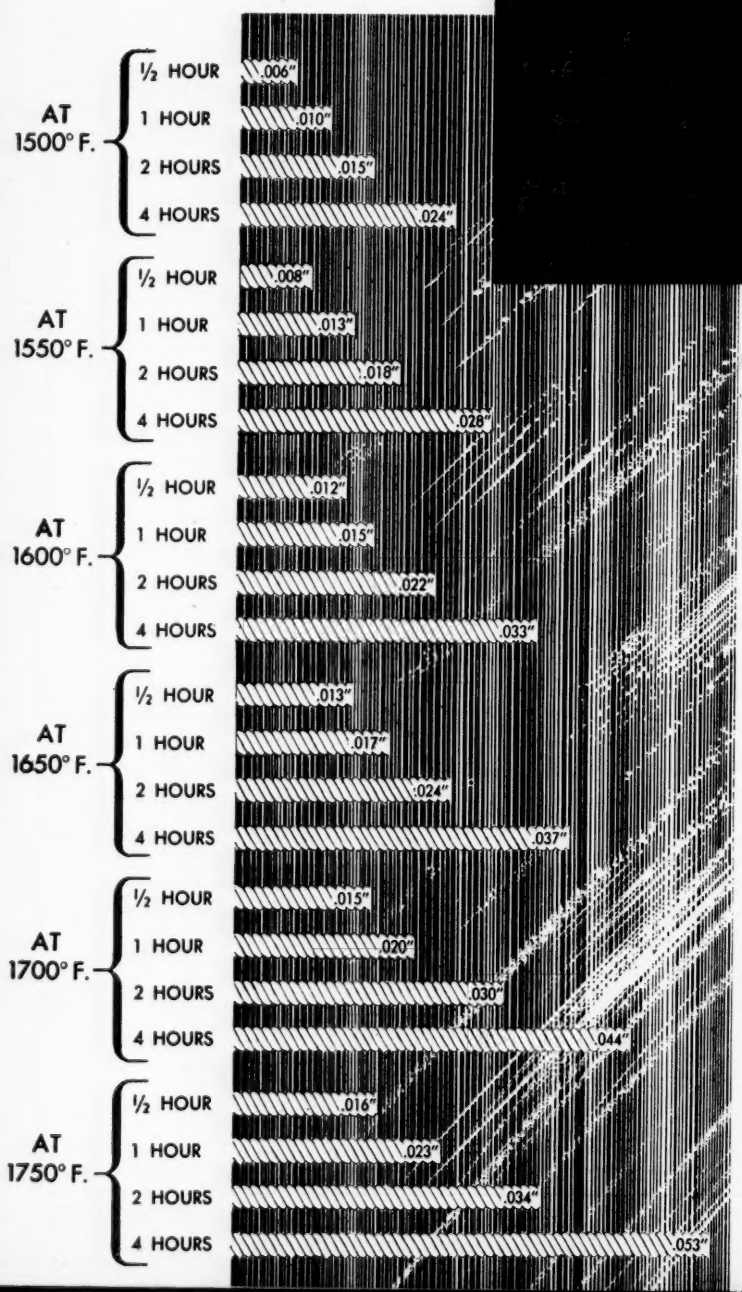
METALLURGICAL ENGINEER: B.S. degree from major eastern university, married, age 28. Presently serving second tour of duty in Navy. Three years experience in heat treating, two years in nonferrous refining. Desire position in metallurgical capacity. Available November. Box 7-140.



TYPICAL MICROGRAPH

TOTAL DEPTH OF CASE .038″
TOTAL DEPTH OF CASE .35 CARBON .030″
TIME, 4 HRS. TEMPERATURE, 1650° F.
DIMENSIONS OF SPECIMEN, 1″ RD. x 4″ l.
MAGNIFICATION 100X.

CASE DEPTHS VS. TIME



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